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Improvement in Setting Blocks for Saw Mills.

Fig. 1 of the accompanying engravings presents a perspective view of an improved device for setting logs to be sawed to any required thickness. The setting frame, it will be seen, is not in proportion to the carriage and frame, as the representation was taken from a model; practical sawyers will, however, readily understand the operation of the device. Fig. 2 is a top plan of the setting device.

The machine is driven by a belt on the pulley, A, on the same shaft of which is another pulley, driving by the belt, B, a loose pulley, C, the hub of which is a clutch engaging with a similar clutch forming part of the pinion, D. A lever, E,

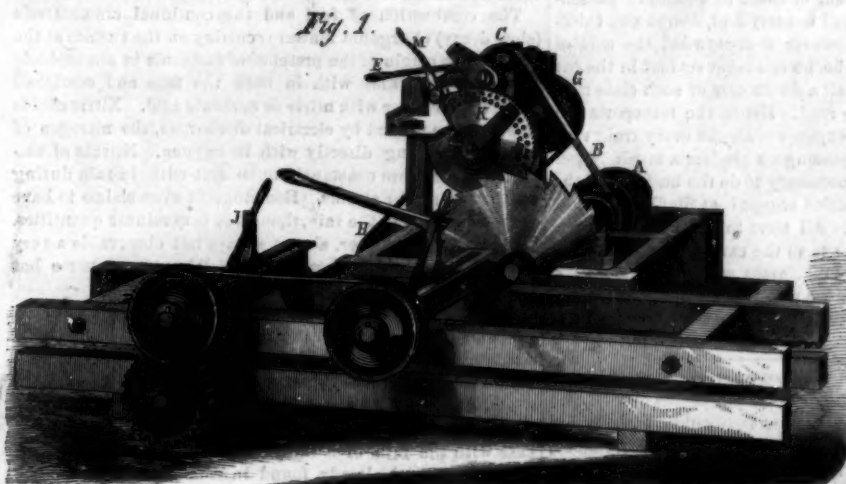


Fig. 1.

serves to ship the gear and clutch, D, from contact with the gear, F, and pulley, C, when the machine is to be operated by hand. A belt from the pulley, G, the shaft of which carries the gear, F, drives the pulley, H, Fig. 1, and this, by means of the gear, I, same figure, turns the screws that move the head blocks, J, the two screws being connected by pulleys and belt as seen in both figures. The connection between the driving power and the movable heads is thus sufficiently explained; the automatic setting of the log is assured by the device to be described.

On the shaft that carries the pulley, G, is an index plate, K, perforated with holes, and having a toothed or serrated edge. In the holes fits a pin passing through a slot in the spring, L. A pawl lever, M, held to the periphery of the index wheel, K, by a spring, engages with the ratchet teeth on the disk. Attached to the disk or index is a cam, N, seen in Fig. 2, that operates an arm, O, secured to the shaft on which are the wheels, D and C, and moves the clutch on the same shaft to disconnect it with the pulley, C, which is held in place by the guide, P, Fig. 2.

The holes in the disk are numbered, and spaced to correspond with the pitch—four to the inch—of the screws which move the head blocks, J. Of course the gears, D and F, have teeth, in number conforming to regular proportions, those in the first being just half as many as those in the latter. Consequently, for every turn of the screws, the wheel, D, makes two revolutions, while the gear, F, makes one. By these means unfailing accuracy is secured.

When any given thickness of lumber is required, the pin in the spring, L, is set in that hole in the index numbered to correspond to half the number of revolutions of the pinion, D. If, for example, ten revolutions are required to move the log the distance desired, the pin is set in the hole numbered five. The two halves of the clutch are then engaged, and the machine put in motion, when a little dog on the shaft, carrying the arm, O, successively, moves one tooth after another with each revolution of the shaft, and the movement being completed, the cam, N, engages with the arm, O, and instantly disconnects the clutch, and stops the transverse motion of the log. Then, by drawing back the pawl lever, M, the index is thrown back to its starting point by means of a coiled spring, and engaging bar on its face—seen in Fig. 1. When only half a turn is desired, the pin is set in one of the inner circle of holes in the index.

The inventor claims, that with this machine the work can be done quicker and better than by hand, that the device sets the log always accurately, and its use dispenses with the labor of one man or boy. It can be changed instantly, while the machine is running, from one grade or thickness of lumber to another. Lumber sawed by a machine provided with this attachment is much more even in thickness than that which is sawed on the ordinary mill where the stock is fed to the saw by hand. The patentee will sell the right for the Eastern States. The letters patent, dated Sept. 17, 1867, were procured through the Scientific American Patent Agency by Titus Whitmore, Dubuque, Iowa, whom address for further information.

Important Patent Suit.

A patent case of great importance to stove manufacturers has recently been decided in the United States Circuit Court for the western district of Michigan. This was a suit in chancery between parties residing at Kalamazoo, for the infringement of a patent for a stove machine, granted to Wm. Sisson, of Fulton, N. Y., on the 24th of Sept., 1861, under which the complainants claimed. The defense denied that

motion toward the operator will cut the cane off at any required point. By removing the spring and blade, B and C, the implement becomes an efficient pruning knife. The dotted lines show the position of the spring blade when brought up to receive the cane. This blade with its spring is attached by a nut and screw or some other suitable device to the end of the shank of the knife proper, and is constructed so as to pass freely by the main blade and to have

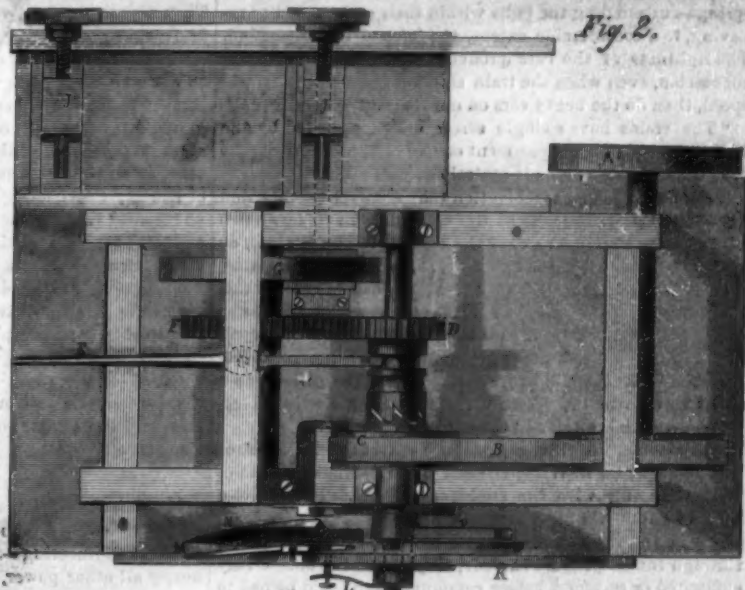


Fig. 2.

WHITMORE'S PATENT HEAD-BLOCKS.

the improvement was invented by Wm. Sisson, and also alleged that if he was the inventor he had abandoned the invention to the public before making application for his patent. The case came on for a final hearing at the October term, and the Court fully sustained the patent, and issued an injunction to restrain the defendants from the further use of the machine.

BARLEY'S CANE STRIPPING AND PRUNING KNIFE COMBINED.

The improvement illustrated in the engraving is intended for topping, stripping, and cutting off the cane of sorghum or the ordinary sugar cane to prepare it for the grinding or squeezing process. The blade used for topping the cane is



curved as at A, similar to the blade of a pruning knife. Its back at the rear end next the handle is formed into a curved edged jaw, in connection with which the spring jaw, B, completes a device for stripping the cane of its leaves.

In operation, after topping the cane with the blade, A, a pressure of the index finger on the spring, C, opens the jaw, B, to receive the cane, when the tension of the spring, C, will grasp the stalk, and a downward motion of the hand holding the stripping knife cleans off the leaf blades, and a drawing

its point engage with the opposite side of the blade, which gives it a firm hold in the act of stripping.

This improvement was patented through the Scientific American Patent Agency, Sept. 24th, 1867, by J. H. Barley, who will reply to all communications addressed to him at Sedalia, Mo. Territorial and manufacturing rights for sale.

PASSENGER TRAVEL ON BRITISH RAILWAYS.

From the columns of an exchange we transfer the following interesting correspondence respecting English railways as compared with those of our own country. The rolling stock on the English roads when contrasted with that found on American railways at first strikes the stranger unfavorably. The locomotive without polish, painted with a dull, gray, stone paint, illustrates the contempt for appearances as to attractiveness in color or model characteristic of English ideas.

"Cars with like dark, dingy color, improved by coal smoke, and ugly baggage railings on top, with some tarpaulin coverings thrown over the unsightly piles of old trunks and furniture, make up even the first-class trains. Coal is burned in these locomotives, in furnaces at the rear within the exterior circle of the tubular boiler, the heat being conducted through the boiler by a multitude of small tubes terminating in front, in a common air or smoke chamber, from which a funnel or flue, about twelve inches in diameter, with a top shaped like an inverted bell, rises perpendicular about three feet above the top of the boiler. Of course they need no spark arresters, and seem to require less draft in running their fires than ordinary wood engines.

"These engines are scarcely two-thirds as high as locomotives on American roads. It seems to be a desideratum to place the weight of the machine and the water of its boiler, as near the track as can be done, and still leave the necessary space for its wheels and machinery. The cars are about twenty-five feet in length, and run on double trucks like ours, but on two pairs of wheels to each car, with a shaft passing through a frame on which the car body rests, with intervening springs. The wheels are not as large or so heavy as those used on American roads, bringing the body of the cars some eight to ten inches nearer the track.

"Each car is divided into three compartments or 'carriages,' each carriage with two seats across the car, facing each other—the entrance being on the side, between the seats. Each seat will accommodate three first-class passengers, or four second or third-class. The interiors of the first-class carriages are luxuriously upholstered, the seats being finished as easy chairs with side arms, so that the seats occupy the width of the car, and eighteen sittings will fill an entire car. The second-class cars or carriages, for first, second and third-class carriages or compartments, are sometimes found in the same car, and are furnished with cushioned seats and cushions for the back, but have no divisions into separate seats, so that eight passengers can sit quite comfortably in each carriage, or 24 in each car when full. Third-class cars have either plain board seats, or in some cars, none at all.

"The gage of English railways is four feet, eight and one half inches, and while cars on American roads have a projection of over a foot on each side beyond the track, the English cars project only from six to eight inches, not measuring the plank step on each side, extending along the car outside, on which the guard or conductor passes the entire length of the train when necessary, while it is in motion.

"The English cars are much lighter in structure than ours, and by their momentum when in motion have less force against the control of the train by the engineer. It will be seen that these cars have no front or rear platform, but are kept apart from each other by spiral-spring railroad buffers. These consist of a turned iron bolt, about 2½ inches in diameter, around which is a coiled steel spring. The bolts and the coiled spring around them are inserted in a socket a foot to a foot and a half at each end of the lower side timbers of the cars, making four buffers to each car, projecting some six or eight inches beyond their sockets in the end of the timbers, and presenting a disk in the form of a bolt head toward the next car in the train some eight inches in diameter, with a wood face sunk in a circular case of iron. As the train slackens speed these disks come in contact and force back the bolts bearing them into their sockets, compressing the spiral springs surrounding the bolts within their sockets and so relieving, to a considerable extent, the force of the concussion. The lightness of the cars produces much less force in the concussion, even when the train slackens from a high rate of speed, than do the heavy cars on our roads.

"The trains have a single screw brake, operated by one brakeman inside a compartment of one of the cars fitted for the purpose. The brake is controlled by an effective power of a screw and leverage combination that answers quickly and effectively the movements of the machine. In this way two brakemen to a train, or one if the route to be run is short, do the work of from three to half a dozen, on our express trains. The conductor or guard, as he is called, has his seat in the rear car, with a compartment sometimes elevated a foot or so above the top of the train, so that he can see the entire length of the train and direct the engineer in any exigency. This is done not by a rope and bell, as with us, but the guard has a shrill metal whistle, whose various sounds are well understood between himself and the engineer.

"Most American travelers have a dread of danger by fire or otherwise, while traveling on such trains, without means of communicating with the engineer or guard. They have a kind of notion that if a kerosene lamp, which is usually let down in the top of the carriage, to light them by night or through tunnels, should explode, they would be considerably suffocated or scorched before communication could be had to stop the trains and facilitate their escape. On the trains from London to distant principal towns, a second guard, who has charge of the baggage, usually goes through. His office answers to that of baggage master with us; though he is of the same grade and authority in running trains as the captain of the train, in case it is put into his hands or the captain should be sick. Hence, the long-travel English trains have two competent guards or conductors, two brakemen, a fireman and engineer, with casual supernumeraries as porters and the like passing over the road. Next to the police, I found the guards on the railways the most obliging men in England. Their responsibility ends with the safe conducting of their train to its destination. They collect no fare by the way, and run their trains by the instructions of the head railway officer of the company in London.

"At the head office, and at the depots along the route, are a class of railway officials called 'booking agents' and porters. Half of these officials either fill sinecures or are employed in red tape details which add nothing to the income of the company. Two ticket agents at depots within our large cities, and the station agent at each intermediate station, are found amply sufficient to conduct the sale of tickets on our most traveled roads. But in Great Britain, first-class, second-class, and third-class tickets must each have a separate agent for their sale at most of the stations, and where night as well as day trains are run, a double number of these officials are usually employed. There are also nearly as many porters as booking agents, thus illustrating the proverb, that 'where the carcass is there will the buzzards be gathered together.'

"The 'luggage vans,' as they are called, are not provided in sufficient size and numbers to accommodate travel on the great thoroughfares, and this custom of loading the tops of the passenger cars has sprung up to meet the exigency. Since I am on the subject of baggage, I may as well note here that all responsibility as to the safe transportation and delivery of baggage by British railroads, is avoided as far as possible. Their system, or rather lack of system, is most villainous. The system of checking baggage, as prevailing in this country and on the continent, is entirely excluded, and the responsibilities of the company are limited by acts of Parliament to the narrowest limits. You may see your baggage put into the 'van,' but what railroad employé knows that it is yours? If a confidence man should turn up at your destination, he might carry off your baggage under claim of ownership, and you have no check by which you can identify your luggage or repel the theft. The English custom in this department seems to make the baggage say to every wanderer loiterer, 'come and steal me.'

"The English railways are constructed at a greater expense per mile than those in America. The road beds are better prepared for their superstructures, rails are laid with more uniform and even supports, and the joints of the rails, while sufficient allowance is made for contraction and expansion by heat and cold, are so fitted as to present a uniform surface to the wheels of the cars, so that little motion or jolting of the cars is felt by the passengers, and traveling is far less fatiguing than on our roads. On most of the lines the expense of

construction is greatly increased by tunnelling and excavations to avoid curves or ascents and descents in the structure. Of course, the tunnels have to be protected by heavy masonry, and the excavations are sloped down from the surface of the ground at an angle of some 45 degrees, the slope being neatly sodded or cultivated with grass, flowers or grain, by the station men along the road. Then the stations are stone structures, erected at great expense; in many instances far beyond the necessities of the business of the roads. Every crossing of the track by highways is either tunneled under the road or bridged over it, as we stated, and at all stations are foot bridges over the road, which passengers and others who have occasion to cross the track must take, as it is a misdemeanor to cross the track otherwise, except by the employes of the road.

"The speed on English railroads varies from twenty to fifty miles an hour, according to the condition of different roads and the exigencies affecting the business interests. On the whole, their speed is about one third greater than that of trains on our own roads.

"I have stated that the rolling stock is much lighter than ours; and ordinary freight cars are limited to five tons burthen by law, or by a legal inspection required by statute. They are mostly flats, relying upon tarpaulin coverings to protect the goods transported from wet weather.

"The fares on these railways are nearly double the fares on our own. The cost of transportation is considerably increased by the English system of caste or classes of passengers. They must go prepared to carry first, second and third-class passengers, while however over-crowded the cars of some of these classes may be, no one must set foot in the car of another class, though half a dozen cars of such class may be running vacant over the road. Hence the transportation of vacant cars is a wasting expense to almost every train run. This division of classes in passengers renders a much larger number of trains each day necessary to do the business of the road. No less than five trains stopped at Stafford on their way to Rugby and London. All were to pass over the same road within an hour of time from the earliest to the latest of the five. If there had been no classes with the passengers, three of these trains would have accommodated all the passengers, and the expense of running two of them would have been saved."

Omnibus Subways.

Mr. Peter Barlow has published the prospectus of a scheme which, if we could take his word for it, would revolutionize railway engineering—dispensing with steam, and, indeed, nearly all other power, and reducing wear and tear to almost next to nothing. He proposes to drive a system of tubular subways under London—first of all under the Thames, near the Tower, and to work carriages through them, each weighing two tons, loaded, and containing twelve passengers, the motive power to be that of one man! Mr. Barlow estimates the friction of his omnibus, running on a very accurately laid railway, as four pound only per ton, and the resistance of the air at two pound more, or six pound per ton in all, or twelve pound only for the loaded carriage! He proposes to make the quarter-mile run of the Tower subway in 2½ minutes, or at the rate of six miles only an hour. With "two and half men," however, which means, we suppose, two men and a boy, the run can, he says, be made in one minute, or at the rate of fifteen miles an hour, which is more like what the public would require.

Of course, if safe railway carriages can be made to weigh no more than the weight of the passengers carried—the present ratio being as from three to five tons of carriage to one ton of passengers, and if the resistance to motion may be diminished to but from four pounds to six pounds per ton, Mr. Barlow's scheme may answer; but so, of course, a reform could be made in all our ordinary railways, which would save something like eight millions yearly in their working expenses, equal to 2 per cent additional dividend upon the £400,000,000 invested in British railways.

Mr. Barlow proposes to drive his cast-iron tubes horizontally through the soil by means of powerful hydraulic pressure; and between stopping-places (for he dispenses with stations) he proposes to let the line descend for half way, and then rise again, so as to help the carriage off on starting, and help also to bring it up without brakes in stopping. The passengers are to be lowered to and lifted from the tubes by hydraulic lifts.

The plan reminds us somewhat of the proposition printed a few years ago by a shareholder in the Great Western Company, who insisted that the trains on the branches of the company's lines might be worked each by a horse, mounted on an endless railway in the guard's van, and who would thus work the train at ten miles an hour, while, "if whipped up," the poor brute would "easily" do twenty!—*Engineering*.

NEW LETTER ENVELOPE.—An English patent has been granted for an improved adhesive envelope named the Camden Envelope. The gum is placed upon the lower fold instead of the flap, so that the tongue comes in contact with clean paper when the flap is wetted to secure the envelope. The general form of the envelope is admirably adapted for the protection of the contents. Those who write many letters will appreciate an invention which does away with the disagreeable task of licking a gummed surface.

A FLOURISHING VINE.—In Santa Barbara, California, is a grape vine planted forty years ago, and which now measures, at four feet from the ground, three feet around it. At the height of six feet it branches out, and the branches, which are supported by scaffoldings, spread over an area of from 1,000 to 1,200 feet. The annual crop from this vine averages four tons, and has at some seasons exceeded 12,000 pounds.

Correspondence.

The Editors are not responsible for the opinions expressed by their own correspondents.

For the Scientific American.

ON SNOW, RAIN, AND HAIL, IN THEIR RELATIONS TO THE ATMOSPHERE.

The condensed moisture of the air is never pure water (H O) alone, as it is generally supposed, it even presents in its composition the same if not a greater variety than the springs flowing from the interior of the earth. This is easily understood when we consider that the elastic fluid which envelops the earth in an aerial ocean is not simply a mixture of nitrogen and oxygen and a small amount of carbonic acid, but also contains, though in small quantities, a great many other substances, which are readily absorbed by the descending precipitates, and as the atmosphere itself is modified in its condition according to adjacent circumstances, so also the condensed moisture, which we perceive in the form of snow, rain, or hail. Though the amount of foreign substances in the air may often almost be infinitesimal, they are not always to be considered as altogether insignificant.

Nitrogen and oxygen are not met with in the same proportions in the many forms which moisture assumes, there being about one-fifth less of the former, one-third more of the latter, with still a greater proportion of carbonic acid contained in them as contrasted with dry atmospheric air.

The combustion of fuel and the continual cremecareasis (slow decay) of organic matter occurring on the surface of the globe is the origin of the presence of ammonia in atmospheric moisture. It is met with in both the free and combined state, in the latter with nitric or carbonic acid. Nitric acid is known to be formed by electrical discharges, the nitrogen of the air combining directly with its oxygen. Nitrate of ammonia is therefore constantly to be met with in rain during and after thunder storms. Bousingault even claims to have found it always in the rain, though in very minute quantities. Its amount is, however, almost always not observable a very great time after the storm has ceased, but the converse has been found to be true of a fine shower.

In snow and hail more ammonia is present than in rain, probably owing to the greater cold in which they are formed, ammonia being more readily absorbed by cold than by heat. Rain falling after a dry season abounds with ammonia, often containing six milligrams to the liter (1 milligram = 0.0154 grains; 1 liter = 1.0567 wine measures), this not being the case with the rain of a rainy period. Nitric acid is, as we have mentioned already, found in combination with ammonia, but only in its free state, during heavy thunder storms, when the rain will sometimes reddens blue litmus paper. The average quantity of nitric acid in rain water is stated to be one-millionth part of its entire bulk. Snow has been found to contain more nitric acid than rain, and hail more than rain.

Traces of sulphuric acid have been discovered in the rain of London and Manchester, and Dr. August Smith is accounting for its presence, which doubtless finds its explanation in the sulphurous vapors produced by the combustion of coal, with the rapid disintegration of buildings in those cities. Sulphuric acid has been detected in larger proportions in the rain of Manchester than in that of London; though London is the greatest city of the world, Manchester is the largest manufacturing town and the center of a manufacturing district comprehending many hundred square miles; hence we must not be surprised to find the products of combustion existing in a larger proportion in the latter than in the former city.

The atmospheric air is also most generally impregnated with the saline products arising from sea water. Near the coast salt is found to be present in rain water to the amount of seven parts to the million, but less than half that proportion some hundred miles in the interior. The French chemist, Barral, calculates that near Paris forty pounds of salt are yearly descending in the rain on one hectare of land (1 hectare = 2.471 acres), and according to Chatin the rain water in Paris during the prevalence of westerly gales is even more impregnated with salt than is the water of the Seine. Snow and hail always contain less salt, as they are formed in more elevated regions.

Chatin also holds that iodine is present in all atmospheric precipitates, which assertion, however, is contradicted by most investigators, they attributing its supposed presence to the impure reagents employed in its detection.

Sulphuretic hydrogen has been observed in the atmospheric precipitates of some parts of the western coast of Africa, where the rivers which empty into the sea abound in decaying organic matter, and phosphoric acid has been detected by Wiegmann in noxious fogs and mists.

Organic substances of an unknown nature are often found in atmospheric precipitates, but Bousingault claims to have discovered marsh gas in the rain of miastmatic sections to the amount of 0.0017 per cent, and Ehrenberg describes the ink rain falling on the 14th of April, 1849, in Ireland over an area of 700 English square miles as putrescent vegetable organism, probably brought there by passing winds.

Non-volatile substances, as meteoric, volcanic, and ordinary dust have often been found in rain, snow, and hail, but they are not of general occurrence. "Photo-chemical analysis," that recent and wonderful discovery, will surely reveal to us many other natural wonders occurring in atmospheric air.

The Hoosac Tunnel Drills.

MESSERS. EDITORS:—I noticed in your paper a short time ago a short account of the Hoosac Tunnel and drills, and credited them to Mr. Burleigh, of Fitchburg. I would merely say that I am the original inventor of the Hoosac Tunnel

Drill that they are now using. I obtained my patent in 1851 and showed a working machine to a number of the legislators at that time. They thought favorably of it, but were too skeptical. I was a number of years ahead of the times. If they had adopted it at that time they would have had a hole through the mountain and trains running a long time ago. I got my patent extended, and have since sold out to Mr. Burleigh, who had taken out a patent which he thought was an improvement. But the drills are made now substantially as I made mine over seventeen years ago. The main idea was using the direct action of the steam or air in a direct line with the drill, so that I could drill horizontally or at any angle up or down, as wanted. Mr. Burleigh, of Fitchburg, now holds the patent, and the machines are made by the Putnam Machine Company, of which he is one of the partners and superintendent, I believe. JAS. W. FOWLE.
Boston, Mass.

Replies to Questions on the Day Line.

MESSENGERS. EDITORS:—On page 387, Vol. XVII. of your valuable paper will be found several questions relative to the day line, which are asked by Mr. Lyman Thayer, of Burlington, Vt.; I suppose for the purpose of bringing out the thoughts of its readers on this interesting question. I think I can solve these questions to the satisfaction of all.

If a man start from New York on Monday noon, and goes west, keeping pace with the sun, he would pass from Monday to Tuesday, when he crossed the day line, which I have taken as the 180th meridian.

If the 180th meridian be taken as the day line, it is 12 minutes of 1 o'clock on Tuesday morning at Pekin, China, when it is noon at New York.

When it is Monday noon at New York, the same day (Monday) extends just 180° east of New York, or about to the 105th degree of east longitude, reckoning from Greenwich, at which point (105° E.) it is just midnight. And the same day of the week will extend west of New York to the 180th meridian, to the east of which line it is a small fraction after 5 o'clock on Monday morning, while on the west side it is 5 o'clock Tuesday morning; thus making about 24 hours difference in time between the two sides of the day line.

To the question whether there is a point of time in the revolution of the globe when it is Monday, for example, on the entire globe, I would reply that there is such a point of time, but so inconceivably short that it is totally inappreciable to our senses, but for all practical purposes such a point of time may be considered to exist, and just 12 hours from this time it is Monday on one half of the globe while it is Tuesday on the other.

In regard to the day line itself, I cannot think such a line does really exist; but for this very reason it becomes more important to define such a line by legislation; and the one which answers the purpose best, I think, is the 180th meridian from Greenwich. If reference be made to a map of the world it will be seen that the only land through which this meridian passes, is the extreme eastern part of Siberia, where it would not much interfere with the day question. Another reason is that if this meridian (180th) be taken to represent 12 o'clock midnight, it brings the meridian of Greenwich at 12 o'clock noon, which is the most convenient starting point in applying the device, seen on page 324, Vol. XVII. of this paper, to all maps, as there briefly hinted at.

Much more could be said on this subject, but I will not occupy your valuable time and space.

W. R. SHELMIER.

Philadelphia, Pa.

Heat Without Coal—Utilization of Wind Power.

MESSENGERS. EDITORS:—Looking forward to the exhaustion of the fossil fuel which nature affords us in the coal fields, economists have speculated on the possible discovery of some method of producing heat independent of coal, and the decomposition of water has been regarded as a probable expedient. With our present knowledge and appliances it appears not to be difficult to realize this proposition, even in competition with coal, at least in a small way. The agents are obvious, wind-power, a magneto-electric machine, oxygen and hydrogen gas holders, and the electrolysis of water. The products of combustion being only water, they could be burned for room warming without a chimney.

For use in the arts the oxy-hydrogen furnace would of course offer advantages far above any other known, and results could be reached impossible with the lower temperature of the coal fire, while the flame would be free from deleterious substances common to coal.

Owing to its gaseous form and the intensity of its heat this fuel would be manageable in many ways impracticable with coal. For instance seams could be hard-soldered with great rapidity with the jet of the compound blow-pipe, and it is probable that the joints of steam boilers could be heated for welding in a suitable oxy-hydrogen jet.

Newark, N. J.

H. W. POND.

The Cold Cave at Decorah.

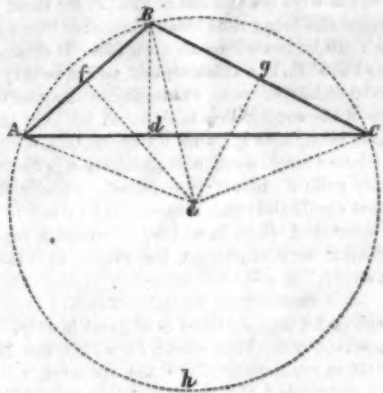
MESSENGERS. EDITORS:—There is at the village of Decorah, near the northern boundary of the State of Iowa, a cave where the operations of nature are reversed. In this cave it is cold in summer and warm in winter. The ice begins to form the fore part of June and disappears again the latter part of August, the coldest period being about the middle of July. On the fourth day of July icicles may be found from six to eight inches in diameter and from four to eight feet long, affording fine sport for the boys who take them into the market for sale. In this cave no ice is found nor sun from September to June, but June, July, and August it is

extremely cold so that a man can only stay in it a few minutes. This cave has been known about twenty years and the above facts appear every year. Thousands of people have been into this cave to see icicles in summer. I wish some one would give an explanation of this strange phenomenon through your journal.

Hardin, Iowa.

Solution of Plane Triangles.

MESSENGERS. EDITORS:—Herewith I send you a geometrical problem illustrated by diagram, which has probably never before been in print. In beauty and utility I believe it stands next to the 47th problem of Euclid, which is, that the square of the hypotenuse is equal to the sum of the other two sides. Having this handed down as a text, it was supposed that the same solution might be applied to any triangle. This may be done by letting fall a line from the apex of the angle, opposite the longest side of any triangle, cutting said side or base at right angles, as seen in the figure; the close



line, A B C, represent the sides given, and the broken lines represent the lines required.

To find A d and C d:

$$\frac{A B^2 + A C^2 - B C^2}{2 A C} = A d \quad \frac{B C^2 + A C^2 - A B^2}{2 A C} = C d$$

$$B C^2 - C d^2 = B d^2 \quad A B^2 - A d^2 = B d^2$$

$$A f : A e :: B d : B C$$

$$B g : B e :: B d : A B, \text{ etc.}$$

$2 A e \times 3.14159 \div$ equal the circle cutting each angle of the triangle.

Let $A C = 10$, $A B = 5$, and $B C = 7$. Then

$$\frac{10^2 - 5^2 + 7^2}{2 \times 10} = 6.2 = C d \quad \frac{10^2 - 7^2 + 5^2}{2 \times 10} = 3.8 = A d$$

I have sought for this solution for some fifteen or twenty years, and think that in all probability it will be, sooner or later, introduced into the common school arithmetic. It will be observed in the solution above given that it is necessary to assume the longest side of the triangle for the base. In short the beauty of the problem lies in the discovery of letting fall from the apex of any triangle upon its base a line at right angles with the base, when the base is the longest side of such triangle, and which unlocks all its intricacies to the simplest rules of arithmetic.

JUSTUS F. HOYT.

New Canaan, Conn.

Removal of Obstructions in the Mississippi at Rock Island.

MESSENGERS. EDITORS:—I have seen a report of the wonderful performances of the "chisel boats" on the upper or Rock Island Rapids of the Mississippi, which is somewhat overdrawn. Perhaps you would like to hear the truth. The Rock Island Rapids have been a very serious obstruction to the navigation of the river in times of low water, being about fifteen miles in length and having a fall of about eighteen or twenty feet. Congress at least once before made an appropriation looking to the improvement of the channel, but the work done did not in the opinion of the pilots render the navigation less dangerous than before. The last Congress appropriated \$300,000 for the same purpose, and the United States engineers decided to remove the rocks to the depth of four feet below the low water of 1864, the lowest ever seen by the white residents on the banks of the Upper Mississippi. There are seven reefs to be removed. The contract was awarded to C. G. Case & Co., of New York, who built two "chisel boats," three barges, and other craft, suitable for the work, besides buying a steamer and one of the largest and best dredges in the West.

The chisels are raised and allowed to fall like a pile driver, and are made to fall about six times in a minute from a height of twelve feet. They are cold chisels, pointed, and weigh 6,000 pounds each. They sometimes penetrate the rock to the depth of six inches the first fall, and sometimes drop three or four times without effecting anything; but altogether they are successful. The rock has no stratification, and yields reluctantly to the hardest blows.

The company have also coffered a space of 450 by 250 feet, and are blasting out the contained rock to the depth mentioned before, which will require the removal of 7,000 cubic yards. I send you by express an oyster can full of the most characteristic specimens I could procure. The work is more than half done on this chain (Duck Creek), and the weather all that could be desired. There has been no day in four months that could prevent men from work, and if my memory is right not a drop of rain has fallen here in that time.

THOS. DOUGHTY.

[The samples sent are limestone containing crystals of metallic sulphurets. The rock is favorable to the success of the chiseling process.—Ers.]

Momentum and Inertia.

MESSENGERS. EDITORS:—I venture to offer an answer to that supposed paradox presented under the above title, on page 310, Vol. XVII.

There is no substance in the world so hard as not to yield at the point of contact when two such bodies should meet, as supposed in the problem. Admitting this, it contains nothing impossible or unnatural. The small body comes gradually to a rest, and is then gradually set in motion in the opposite direction, while the larger body continues to move, and loses only a part of its velocity. Within the small interval of time that this occurs, the two bodies come nearer together, while their surfaces yield at the point of contact.

The question is to be decided upon some other point, viz.: What is elasticity, and what makes a body non-elastic?

For example, a piece of lead is non-elastic, why? Suppose it strikes against some hard obstacle, by which it is brought suddenly to a dead rest. While the lead was in motion it carried a certain momentum, or, in other words, a certain amount of native power, and which I call simply "force." This force cannot be lost or annihilated, it can only be consumed by producing mechanical work or effect, for which a reasonable account can be given. What has become of this force, or of the momentum of the lead? This force was consumed by the friction of the molecules of the lead, while it was flattened or split in fragments, or otherwise changed in its shape.

If we take a piece of hard steel, as for example a small hammer, and strike against a heavy anvil of equal hardness, the hammer will be thrown back, why? Because neither of these bodies suffered any lasting indentation, because no mechanical effect has been produced which would consume the force of the blow; consequently this force is returned, and throws the hammer back. This is elasticity.

Glass is elastic to a certain limit. When the force of the blow exceeds this limit, the excess of the force, which is not taken up by elasticity, will break the glass, in consequence of which the force will be consumed and not returned. A piece of pumice, burned clay, or charcoal, is non-elastic, because the force of the blow is consumed by breakage of some minute parts of such a porous and fragile substance.

This may suffice to show that elasticity is nothing else but the manifestation of one of the most important laws of mechanics, the preservation of force, and that if really any perfectly hard and non-elastic substance should exist, the slightest blow must cause some breakage, as may be inferred from the above example of glass. And from this it will be seen, more clearly, that the above problem supposes an impossibility in the premises, since the momentum or the force of the small body cannot be annihilated instantaneously, but can only be consumed by producing some mechanical effect, in consequence of which the surfaces of the two bodies must yield in some way at the point of contact, at least by breakage, if not otherwise.

J. G. KONVALINKA.

Astoria, L. I.

Aluminum for Mathematical Instruments.—Folding Machine.

MESSENGERS. EDITORS:—On page 292, Vol. XVII., I notice an interesting article on "Aluminum, its properties and uses." I am a civil engineer and surveyor, and would like to suggest, through the columns of your highly valuable journal, the advantages of the use of aluminum for the construction of civil engineering and surveying instruments. Accuracy, strength, and lightness are the requisites of a good instrument, the last quality having to give way to the two first, in the construction from the material now used. To illustrate my idea, I will take for an example one of Gurley's solar telescope compasses, with adjusting socket, which weighs 12 lbs.; if constructed of aluminum, with the same sized parts, it would weigh about 3 lbs.; and if the metal is as strong and rigid as it is represented, the thickness could be reduced at least one-fourth, which would make the weight only 2 lbs. 4 oz. I have been informed that aluminum could be obtained in large quantities at from \$6 to \$8 per lb. (I do not know whether by troy or avoirdupois weight); but say that it is worth \$1 per oz., avoirdupois, then the material for the instrument would cost only \$36 (I make no allowance for filing and chips, as they could be saved the same as in working gold, and the weight of the glass would compensate for the unavoidable losses in working), from which take the cost of the metal now used, say \$4, and it leaves only \$32 as the extra cost of an aluminum instrument. Of course, if the metal can be obtained at 50 cts. per oz., the extra cost would only be \$14. Now, gentlemen, I do not think there is one engineer or surveyor in fifty, who would not pay even \$50 extra, for an instrument that weighed only about 2½ lbs., instead of 12 or 14. I think that manufacturers of mathematical instruments would find it profitable to turn their attention to the subject; the first one who does, and lets me know through your columns, will get one order, sure, from the Rocky Mountains.

It would be very interesting to me, and, judging by myself, I think to the majority of your readers, if you could compile an account of the different processes now known and used for the reduction of the metal from its ores. The ores of aluminum are the most common of any known metal, not even excepting iron, and I beg leave to predict that as we now live in an iron age, so will those who live twenty, or perhaps many less years hence, live in an aluminum age. As soon as the right process for the reduction of the metal from its ores is discovered, then we will see an entire revolution in mechanics and civilization, which is now beyond the comprehension of ordinary mortals. Speeds in traveling will be attained which, if told of at present, would appear wild and chimerical; ship building and warfare will be revolutionized; pneumatic railways will be common; the problem of navigating

the air will be solved; velocipedes and steam carriages for common roads will be as common as horse conveyances are at present; grades can be established on railways that are now perfectly impractical, and other improvements made in mechanics and engineering that are not now imagined by the most far-seeing thinker. For in the metal aluminum we have combined the maximum of strength and durability with the maximum of weight. The day is not distant when some person will discover the right process. Many more wonderful, and seemingly more difficult processes, have been brought to light in the past few years. Now, in order to give the inventive public (who all take the *SCIENTIFIC AMERICAN*, or ought to) a cue to the future process, please give them all the information you can in reference to the subject, and let them go to work, and they will soon ferret out the simple process needed.

I believe you like to have hints thrown out to inventors, so while I am in that line of business allow me to suggest that some inventor get up a machine to fold quarto and octavo papers; for instance, the *SCIENTIFIC AMERICAN* comes to me sometimes terribly askew. I am always too anxious to read it to take time to refold it and straighten out the creases before cutting, and therefore spoil the paper for the binder, and sometimes even cut the reading matter. I think you will bear me out in my assertion that some sure and easy way of accurate folding is a desideratum to both the publishers and readers of newspapers of a "several-fold-up" form.

Please hurry up your prospectus. Our club was enured out of six numbers of the *SCIENTIFIC AMERICAN* by being so far away that we were not in time, and we cannot afford it again; besides, the "Noble Red Man" was in quest of science, and overhauled the mails, depriving us of eight or ten more copies. The *SCIENTIFIC AMERICAN* is just as welcome a visitor out here in the Rocky Mountains as it was back in "America." Our prayers are for our weekly *SCIENTIFIC AMERICAN*, as well as for our "daily grub." "ALUMINIST," Helena, Montana.

[Aluminum is prepared from cryolite, a compound of sodium, fluorine, and aluminum, procured mainly in Greenland. It is mixed with common salt and sodium, in the proportion of about 270 parts by weight of cryolite, 150 of salt, and 72 of sodium, and melted in a crucible. No feasible and cheap method of reducing the metal from ordinary clay has yet been discovered.]

Folding machines for newspapers are in common use, but as a general thing they do not equal, in exactness of work, hand labor.—EDS.]

Extirpation of Cockroaches.

MESSENGER EDITORS:—We have been greatly troubled for two or three years by roaches, the real, big, black fellows. By continued exertion we confined them to the vicinity of the furnace and range, but to exterminate them all sorts of traps and exterminators proved ineffectual. Somebody told us of Paris green, and it has done the work. We feel so rejoiced that we desire to give the knowledge to the public. Paris green can be procured at any apothecary store. Just sprinkle it round where "they most do congregate."

B. F. BURGESS, JR.

Boston, Mass.

NAPHTHALIN AND ITS USE.

Naphthalin was discovered in 1820, by Garden, among the products of distillation of coal, and has since been the subject of thorough investigations of Faraday, Liebig, Woehler and many other chemists. Laurent occupied himself especially with its derivatives, and founded thereupon his new theory of organic compounds. Up to the present time naphthalin only was of scientific interest, and of a very limited practical use, when in 1860 Roussin, a French chemist, by his repeated experiments at once drew the attention of the scientific world to this hitherto so-considered worthless substance. He succeeded, namely, in producing a dye-stuff from it which he considered the *alizarine* of the madder, but which, though identical in its chemical composition with the natural *alizarine*, has subsequently been found to be very dissimilar to it. It therefore became suddenly lowered in the estimation of those whose interest was connected with it, and was subsequently looked upon as being as worthless as before, the more as other coloring matters which had been prepared from the same substance met with the same fate. Quite recently, however, European investigators have succeeded in producing benzoic acid from this hydrocarbon, a substance largely used in the preparation of tobacco sauces, in calico printing, in the manufacture of aniline blue and benzol, respectively nitrobenzol and aniline; and it is therefore that I call attention to this subject. I first will describe the

PREPARATION OF NAPHTHALIN.

Although this hydrocarbon (its formula is $C_{10}H_8$) is a product of the distillation of coal, it does not pre-exist in them, as is the case with paraffin. [I have, in the laboratory of Prof. Holley, in Zürich, extracted small quantities of paraffin from boghead coal. The coal was previously pulverized very finely, and the extraction was performed by cold ether.] It is only generated at a high heat, such as that of the retorts in gas works when in full operation. In the manufacture of gas comparatively large quantities of tar are obtained, the conversion of which into permanent gas has puzzled the ingenuity of inventors since the first introduction of gas illumination on a large scale, and still remains an unsolved if not an insoluble problem. In distilling this tar, and in only gathering those portions which run over between 400° and 500° F., we get the so-called "pitch or dead oil," which is employed for the extraction of naphthalin. The residue remaining in the still is

the substance into which the blocks of Nicholson's pavement are dipped, previous to their being inserted in the street.

According to a paper recently published by Dr. Vohl, the pitch oil should be put in vats and left in a cool cellar from six to eight days, after which time most of the naphthalin will have crystallized out. The latter is then filtered from the liquid portions and transferred into a centrifuge, for the purpose of separating it from the adhering oil, but as this cannot be arrived at at once, the crude naphthalin is then subjected to hydrostatic pressure, commencing with a light pressure and increasing gradually until completed.

The pressed mass is then put into an iron vessel, which is heated by steam; in order to take up the creosote, the phenylic acid and other impurities, it is first melted with a small percentage of caustic lye, and stirred well; after a while the lye is drawn off, the same process being then repeated. After this the naphthalin is washed with boiling water, then it is treated with oil of vitriol of 45° Baumé, and finally mingled again with lye and left at 212° F. for three hours.

The naphthalin being thus treated is poured into a cast iron still, which can be heated on an open fire. It commences to flow over at 410° F., in a thick stream, and in twenty minutes generally 20 to 25 per cent of naphthalin may be obtained. The water of the condensing tank must be kept at 170° F., the receiver being also kept in water of this temperature. When the latter reaches 450° the distillation is fractioned, as then an oily yellow product is obtained. Finally the liquid and purified distillate is run into conical cylinders of glass, metal or moistened wood, in which it solidifies rapidly, and in contracting separates from the sides. It is thereby obtained in sticks, like solid brimstone.

PROPERTIES OF NAPHTHALIN.

The naphthalin thus obtained is of great beauty. It forms brilliant, white, crystalline sticks, in which the interstices and crystalline vegetations have the appearance of spirals. Its specific weight is 1.15173, its melting point 174°, and its boiling point 452°. The following new properties are added to the already known ones by Dr. Vohl, in Cologne. When a naphthalin stick is rubbed with a silk cloth it gets strongly negative electric. Melted naphthalin absorbs a great amount of atmospheric air, which it gives off in cooling. When put in quantities of from one to two pounds the expulsion of the air is so turbulent at this stage that the liquid appears to be boiling. The air absorbed by melted naphthalin is abounding in oxygen; perhaps it is pure oxygen. This phenomenon has therefore a great similarity with the peculiar movement taking place in the cooling of silver, and called "spratzen," in German. Melted naphthalin dissolves indigo with great ease, forming a dark-blue violet liquid, from which, in cooling, the indigo separates again, in brilliant copper-like needles. The sulphurets of arsenic, tin and antimony are taken up abundantly in their amorphous state, in cooling they separate in crystals. Phosphorus and sulphur are also solved rapidly by liquid naphthalin.

TEST FOR NAPHTHALIN.

To detect this hydrocarbon in a product of distillation, the latter is, according to the writer of this, treated with fuming nitric acid, in order to transform the naphthalin into its nitro-compound; this being insoluble in and lighter than water, it will rise to the top. It is then gathered and converted into naphthylamin, by any known method. The best is that of Béchamp, who uses iron filings and acetic acid. In adding chloride of iron to an alcoholic solution of the naphthylamin a deep blue color will be produced.

ITS TRANSFORMATION INTO BENZOIC ACID.

The first step in the two or three processes known, is the production of naphthalic acid, a body of the chemical formula $C_{10}H_6O_4$. While, however, the brothers Depouilly, in Paris, directly convert the latter into benzoate of lime, separating therefrom the benzoic acid, Laurent and Casthelay change the naphthalic acid successively into phthalamid, benzoniol and benzoate of soda, a process lately fully described by me in one of the meetings of the New York Polytechnic Association. The method recommended now by high scientific authorities is a combination of a French and German one, namely, of

- The process of Dr. Vohl for the preparation of naphthalic acid, and
- That of the brothers Depouilly, as indicated.

Naphthalic Acid.—While hitherto naphthalic acid was obtained by a very tedious way of preparation, which was not only injurious by the highly irritating gases escaping, but also yielded a small percentage, it may now conveniently and cheaply be produced by the process invented by Dr. Vohl. According to the same, 12 parts of naphthalin are dissolved in 100 parts of concentrated oil of vitriol, and to this 89 parts of finely pulverized bichromate of potassa are gradually added. The reaction ensuing being over, the product is solved in boiling water, and the liquor thus obtained is oversaturated with carbonate of soda; it is then left to settle for a quarter of an hour. By filtration, a rich orange-colored liquid is obtained, which, in evaporating on the water bath, yields the naphthalic acid.

Benzoic Acid from Naphthalic Acid.—This process is based upon the fact that naphthalic acid in presence of a surplus of an alkaline base (lime), and at a temperature of 625° to 660° F., is changed into benzoic acid. The process, however, has to be performed in vacuum.

The brothers Depouilly indicate the reaction taking place as follows:

Naphthalate of lime = $C_{10}H_6O_4 + 2Ca, O$, and hydrate of lime = Ca, O, H, O , yield in heating to the above temperature. Benzoate of lime = $C_{10}H_5O_3 + Ca, O$, and carbonate of lime = $2(Ca, O, CO_2)$.

As seen from this equation, decomposition of water and formation of carbonic acid is taking place. As the success of

this operation, however, is often depending upon mere chance, it requires great skill and practice. From the benzoate of lime, the benzoic acid is separated by hydrochloric acid. In distilling the naphthalate of lime in presence of lime, benzol is formed, an operation which is nearly always of success.

NAPHTHYLCARMIN.

If the orange-colored liquor, containing the naphthalic acid—vide above—is oversaturated either by hydrochloric or sulphuric acid a precipitate in flocs of a most beautiful carmoisin red is obtained. The same is undoubtedly identical with the *carminnaphte* of Laurent, which this investigator obtained once in heating naphthalin with bichromate of potassa and sulphuric acid, but could not produce again at any subsequent trial. This substance combines readily with alkalies, yielding yellowish-red lacs, and dyes silk and woolen without mordants, either orange or violet red. It is soluble in acetic acid and alcohol, and is precipitated again from its compounds by mineral acids.

On the Formation of the Diamond.

Researches on this subject have lately been made by Messrs. Goeppert and D. Brewster. The black diamond of Bahia is, according to Mr. Goeppert, a mixture of amorphous carbon and diamond. M. Liebig's experiments on its combustion also agree with this statement. It often happens that the diamond incloses other crystals; iron pyrites, particularly, have been noticed in it by Mr. Hartwig. Sir David Brewster calls attention to the microscopic cavities existing in this as well as in other gems, as in the topaz and emerald. These cavities are found to be often very numerous in certain dark diamonds, they thus dispersing the rays of the light, are therefore of no value in jewelry. Mr. Goeppert remarks that the diamond must originally have possessed a certain plasticity; we notice, in fact, in a diamond belonging to the emperor of Brazil, the impression yet of a sand grain. The black as well as the crystallized white ones bear also the signs of analogous impressions produced by foreign bodies. Some investigators believe to have recognized the cellular tissue of plants in the ashes resulting from the combustion of this gem. Mr. Goeppert, however, has not yet detected with certainty any traces of organization, neither in the diamond nor in its amorphous form, the plumbago. As to the question so often discussed, whether the diamond be formed by platonian or neptunian action, the latter naturalist is of the opinion that the first hypothesis is scarcely admissible, the experiments of Depietz having shown that the diamond is changed into a kind of coke, whenever exposed to the intense heat of a galvanic battery. The second hypothesis, attributing its formation to neptunian action, is sustained by the authorities of Newton, Brewster, and Liebig, being also that which is best in accordance with all that is known about the gneiss, itacolumite, and the metamorphic rock in which it is found. The character of these rocks, however, do not allow us to attribute to them a plutonic origin.—*Cosmos*.

A Daring Explorer.

At the last meeting of the California Academy of Science, a letter was read from William H. Dall, Chief of the Scientific Corps of the Western Union Telegraph Company, dated at St. Michaels, Alaska Territory, and acknowledging his election as corresponding member of the Academy. When the telegraphic party returned from the wilds of those northern regions, as we noticed in a late issue, this gentleman remained behind to prosecute scientific researches and gather information respecting this country. That the work he has undertaken to perform is no easy one, an extract from his letter will show. He says:

"I have traveled on snow shoes about 400 miles, camping in the open air, with the thermometer from 8° to 40° below zero. I have seen the thermometer down to 68° below zero. In the spring I started from Nulato, on the Yonkon River, where poor Kennicutt died, and paddled up stream 650 miles in an open canoe to Fort Yonkon, being the first American to make the trip, and one of the only four men out of the whole expedition who have been there. We met two adventurers returning from a trip of 600 miles further, and all hands came down together to the sea and round to St. Michael—a nice little trip in an open canoe of 1,300 miles. We had plenty of rain the last part of the journey, and made the trip in 16 days. This is the first trip ever made to the sea from Fort Yonkon direct. I have acquired sufficient knowledge of Russian and one or two Indian dialects to get along very well. I do not like the country. It is full of mosquitoes in spring; the summer is constant rain and fog, and the only pleasant time is the winter, when it is very cold. But in consideration of the work, I can stand it another year."

NEW GALVANIC BATTERY.—We have had in use in our laboratory a most singular looking piece of apparatus, devised by Moses G. Farmer, Esq., the well known electrician of this city. It is a new form of instrument for converting heat into electricity, and most satisfactorily does it perform its work. All that is necessary to put it into active operation is to light a gas jet, and in a few moments the electrical impulses are manifested, and the battery is ready to be set to work. It deposits metals with great facility, and the development of the agent is constant and uniform so long as the heat is supplied. It resembles a "fretted porcupine" as much as anything we can compare it with. The metals employed in its construction are antimony and copper. The strips or arms of copper protrude outward from the bars of antimony, so as to secure the cooling influence of an air current, while the gas is heating the other extremity. A portion of the heat of the flame is transformed over into electricity, thus showing the easy convertibility of one imponderable into another, and the correlation of the forces.—*Boston Journal of Chemistry*

Skating Rink.

In the vicinity of the Central Park, New York City, several enterprising persons have caused whole blocks of ground to be flooded, and on the margin of the pond have erected temporary buildings, for the use and comfort of skaters, and the bands of musicians who play enlivening airs during the afternoons and evenings of the skating season. The proprietors call their respective places skating rinks; but in true terms they are simply skating ponds, unprotected from the weather. But young and old, in large numbers, patronize these ponds when the ice is good, and the scene is very enlivening to the beholder, and exhilarating and improving to the skater, the "poetry of motion," as in dancing, being kept in harmony with the music.

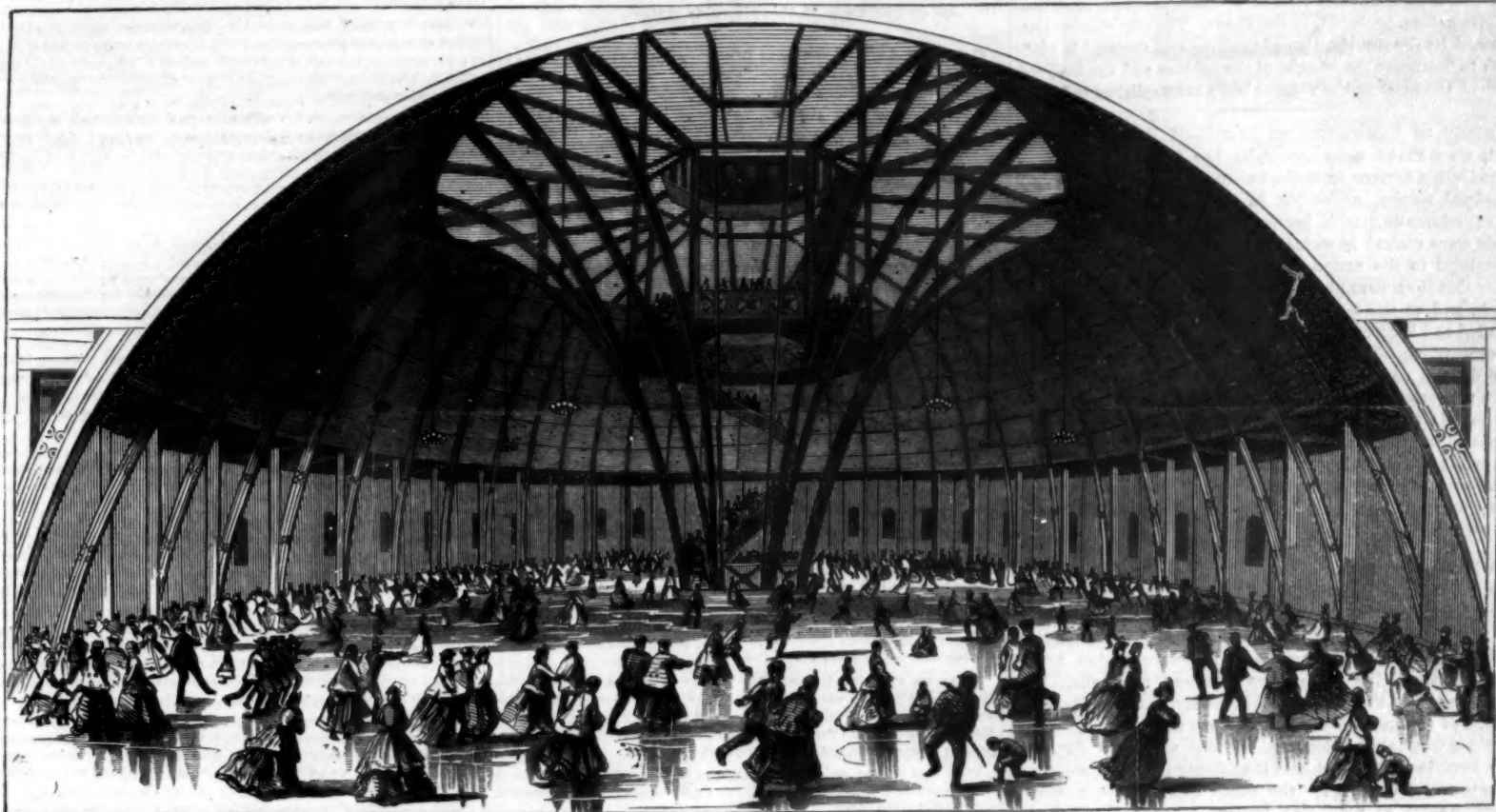
But our British neighbors are far in advance of us in pro-

rooms, and the residence of the janitor. The whole edifice cost about \$12,000, and is in every respect creditable to the projectors and an ornament to the city.

The Dignity of Labor.

"Spice," of the *Boston Commercial Bulletin*, relates the following: "We were never more impressed with the dignity of labor than while witnessing, a few days since, a group of 'down-trodden workmen' engaged in setting up some machinery. There were five of them, or rather four men and a boy, and when they came under our notice, 5:30 P. M., one was engaged in slowly turning over the contents of a box, in search of a screw; two were looking with much interest for the result of the labors of No. 1; the fourth was slowly scratching a piece of iron with a file, and the boy was scratch-

ARTIFICIAL TEETH.—They should never, under any circumstances, be worn at night, and for this reason: it is a physiological fact that bone, in a normal condition, is constantly undergoing a process of removal and replacement of particles, and that continuous pressure prevents the complete restoration of the parts, causing what is commonly called absorption. The osseous structure of the mouth is protected only by a thin covering of muscular tissue and mucus membrane, on the firmness and elasticity of which it depends for protection against the pressure of the plate; but when constantly excluded from the atmosphere, especially by hard rubber, which being a poor conductor of heat, keeps the part covered at nearly an equable temperature, these tissues lose their elasticity and become spongy and fungoid. Two very undesirable results are thus arrived at. The mouth is re-



SKATING RINK AT ST. JOHNS, NEW BRUNSWICK.

viding comfortable and artistic places for the enjoyment of skaters; and we hope, by presenting a view of the best skating rink we know of, to stimulate the exertions of our people to making similar erections in our own cities. Our climate is not so favorable as our neighbors' for enterprises of this kind, but the receipts for even a short season would be very good in a city of the size of New York, and we think it would pay.

From *Harpers' Weekly* we extract the following description of the rink at St. Johns, N. B.:

"In the British Provinces, where the rink exists in its full and sublime perfection, we find structures as spacious and graceful as a World's Fair palace, whose crystal floors are nightly renewed and polished to gleaming by the biting frost. Each night the icy arena is planed by a machine and flooded to the depth of an inch; and then, through every opened door and window, the keen air is admitted to harden and glaze the surface for the next day's sport. From December until March, throughout the long and dreary winter, the rink affords the chief and constant center of attraction; before it all other festivities pale their fires.

"All the chief cities of Canada boast their skating rinks. Montreal has a model one; but for extent, adaptation to the purposes for which it is designed, and beauty of detail, that at St. Johns, N. B., unquestionably bears off the palm. This rink is owned by an incorporated stock company. The main structure is of circular form, 160 feet in diameter, and covers an area of 20,000 superficial feet. It is an immense dome, resting upon perpendicular walls 20 feet high and pierced with 39 windows, and is surmounted by a graceful cupola, or lantern, the apex of which is 80 feet from the ground. This lantern contains 24 windows, throwing light directly into the interior of the structure. Within, and girding the extreme circumference, is a platform, or promenade, 10 feet wide, for the accommodation of spectators. In the center is a circular framework containing a spacious stand for the band, from which a spiral iron staircase ascends to two circular galleries, one above the other, the highest 50 feet from the ground, whence a bird's-eye view of all that is passing below can be had at a glance. From this focal point also spring the supporting rafters that form the huge dome which constitutes the chief feature of the design, producing an effect airy and graceful in the extreme: it cannot be better described in terms unarchitectural than to liken it to a fountain whose waters, springing from the center, fall in majestically-sweeping curves to the outer perimeter. All the area between the band-stand and the circular promenade is covered with ice, which is flooded daily from the City Water-works. The outside front is two stories high, with decorated entablature, and contains waiting and refreshment rooms, dressing-

ing his head. No. 1 finally found a screw to suit him, but during the search his pipe had gone out. Laying down the screw, he began to investigate his pocket for a match. Nos. 2 and 3 searched theirs in sympathy, while the flier paused to see the result. Finally No. 2 found a match, ignited it, and handed it to No. 1, who, having accomplished a light, smoked for a few minutes to assure himself of the fact, while the boy went to the other end of the room to look at the clock. No. 1 then looked at his watch, and compared time with No. 3. Time, 5:40. No. 1 then leisurely put the screw into position to fasten a bar. No. 2 held the bar; No. 3 squinted at it from the other side of the machine; No. 4 inspected the whole operation reflectively, as he slowly resumed the filing, and the boy wiped the oil from his fingers. Time, 5:45. The entire labor was now suspended, while the boy was sent across the room for a necessary tool. Just then it occurred to No. 2 that a chew of tobacco was necessary to his comfort, and, as his supply was out, he applied to No. 3 for the weed, and to No. 2 for a knife to cut it with. No. 1 consulted his watch again. Time, 5:50. And labor was resumed, the screw was turned home; No. 1 tried the bar; Nos. 2 and 3 engaged in a playful scuffle, and the boy looked on with a grin of admiration. The flier laid down his work and looked at his watch, and announced it six o'clock. Tools were instantly dropped, and the five, having accomplished the work of two ordinary men, went cheerfully home."

Editorial Summary.

AMPUTATION NOT ALWAYS NECESSARY.—The *British Medical Journal* calls attention to the fact that several of the men who were wounded in the New Zealand campaign, have brought home arms and legs, which, according to the standard rule of military surgery, they ought to have left behind. Out of six cases of gunshot fracture of the femur, five recovered without amputation, four of them with very useful legs. Of ten cases of gunshot fracture of the humerus, eight reunited solidly, and in only one case was amputation resorted to, and that was primary. Guided by the experience of these cases, the surgeon-general says, it would be fair to expect, that, when eighty per cent of gunshot fractures of the humerus recover without difficulty, that amputation in such cases might be delayed for a second operation, if after all found necessary.

UTILIZING SEWAGE.—At Sandon, Isle of Wight, the sewage is conveyed in pipes clear of the town into cesspits, where it is filtered and decolorized by a chemical process. The clear portion finds its way into the sea miles away from the town, and the solid residue is mixed with ashes and road sweepings, and forms good manure.

duced to an abnormal condition, and the plate no longer fits well, which is just what the patient has been trying to avoid by wearing his plate at night.—*Dental Cosmos*.

A CANAL ON FIRE.—In an investigation as to the condition of the rivers Ayre and Calder, which water the great towns of Yorkshire, it was found that the fluid of Bradford Beck, the source of supply to the Bradford canal, was so corrupt from sewerage, that in summer large volumes of inflammable gases were given off; and although it has usually been considered an impossible feat to "set the river Thames on fire," the boys found it practicable to set the canal on fire, the flames rising six feet high, and running along the surface of the water for many yards, enveloping the canal boats, to the great terror of their passengers. That this state of things is not limited to one district was abundantly proved by inquiries at other towns.

THE SUEZ CANAL.—It has been announced that this great undertaking was in such an advanced stage of completion, that already an English vessel had passed through to the Red Sea. It now appears that the vessel was a Government tug-boat, which was to assist in the embarkation of the Indian troops at Suez, and, that after being lightened as much as possible, even to the removal of the paddle wheels, a number of empty casks were placed under her, and in this manner she reached Suez.

SHEET IRON RAILROAD SLEEPERS.—A curious plan for a temporary railway, to be laid for the benefit of the English forces in their excursion to Abyssinia, has been proposed by a Mr. Hadden. The peculiarity consists in making the sleepers of flattened cylinders of sheet iron, closed at one end, and which are to be filled with sand or gravel well packed. The sleepers are then to be laid on the ground with little or no ballast, and the rails secured to them by clip pieces, so as to be easily removed when desired.

The thin metallic tubes used for holding artists' colors, are made by placing a disk of block tin in a die or cylinder into which a punch is slowly forced by hydraulic or other pressure. The punch fits the cylinder almost exactly, and the tin rises into the intervening annulus, as if it were a liquid, its constituent particles being made to move over each other as they would do if the tin were melted by heat.

AN OLD PIECE OF ORDNANCE.—The Turkish Sultan has given to the British government, in exchange for two large Armstrong guns, a monster gun, twelve feet long, thirty to thirty-six inches in exterior diameter, and weighing from twelve to fifteen tons. Its chief value is its historical one, being one of the pieces of ordnance used in the memorable siege of Constantinople, by Mahomet II., in the year 1453.

WALKING STONES.—We have noticed in this column the "walking leaves" of Australia, and now give our readers the benefit of a statement that has fallen under our notice, of some "traveling" pebbles found in Nevada. They are described as almost perfectly round, the size of a walnut, and extremely hard. When distributed about upon a flat surface, when even separated two or three feet, they immediately gravitate toward a common center. At a distance of five or more feet, the attraction ceases. These stones are found in a very rocky region, which abounds in little basins hollowed out of the rock, from a few feet to a rod in diameter, and in the bottom of these the stones are congregated. We would suggest that perhaps the common phenomenon of the "eye stones"—calcareous concretions—which, when placed in a nearly flat porcelain dish with an acid, as vinegar, will tend gradually toward a common center, receives an illustration, probably, in the above. The effervescence occasioned by the combination of the lime and the acid is sufficient to overcome the weight of the pebbles and the inclined sides of the plate or the natural basin accomplishes the rest.

EFFECT OF ELECTRICITY ON SEEDS.—M. Blondeau asserts that, after many experiments, he has found the action of an induction current on seeds, before planting, produces very beneficial results, noticeable in their subsequent growth. In experimenting with beans, peas, and cereal grains, the seeds were soaked in water for some time, and were then submitted to the action of a current for several minutes. After this they were planted in pots filled with good garden earth, and at the same time other unelectrified seeds were planted and kept under the same conditions for the purpose of comparison. The former always came up first, grew more rapidly, and gave much more vigorous and fruitful plants than the latter. "But," says M. Blondeau, "one very singular fact is that many of the electrified seeds obstinately persisted in growing with the true root pointing up in the air, while the plumule was directed downward;" which gives a little shade of incredulity to the whole statement, but the experiment is an easy one for any interested person to try for his own satisfaction.

A NOVEL HITCHING POST.—The party comprising the Russian American Telegraph Expedition, on their return from the northern region, have brought home many interesting relics. An ivory tusk twelve feet long and measuring seventeen inches in circumference, was purchased for twelve leaden bullets from Indians living in the new territory of Alaska. Near the junction of the Anadyr and Myan rivers the party found a tusk of enormous size sticking some six or eight feet out of the ground and endeavored without success to dig it up. The frost in the ground held it so firmly that they were not able to ascertain whether the other bones of the mastodon were beneath or not. The Indians said that they had used it as a hitching post for many years, and that was all they knew or cared about it.

CHINESE TEA GROWN AT HOME.—In our number for Sept. 28, 1867, we gave a description of Dr. Alfred L. Acee's plantation of tea, at Rose Bower, near Bellevue, Talbot County, Ga. We have now the pleasure of acknowledging the receipt, by express, from Dr. Acee, of a few living tea plants grown by him, together with some of the nuts. We have placed the plants in our green house, and intend to raise some tea from the seed. Dr. A. is entitled to much credit for his perseverance in demonstrating the feasibility of raising tea on this continent. The plant forms an ornamental evergreen shrub, and may be readily cultivated in many parts of the country. Dr. A. states that it blossoms in the fall, that it bears exposure even to freezing sleet, and may be cultivated anywhere in the open fields without manure.

CRYSTALLIZED EGG.—Numerous and of very varying values are the recipes for preserving eggs, which have been given to the world, but a company of this city believe that they have at last attained perfection in this line, though attaining their end in a novel way. Their process is as follows: The fresh eggs are emptied from the shell into a long trough, and into this trough descends a shaft armed with a series of metallic disks, which, rapidly revolving, beat the eggs into homogeneity, and are themselves covered with a thin covering of egg. This thin pellicle, when dried, is scraped from the disks in the form of thin granules, apparently crystallized, and retains indefinitely all the peculiar properties and flavor of the fresh egg.

FERTILIZING PLANTS.—The old idea of botanists that hermaphrodite flowers shed their own pollen upon their own stigmas is now generally discarded, as observation has shown the almost infinite variety of contrivances which Dame Nature furnishes to prevent this. It has been recently noted that the insect world plays a very important part in the fertilization of certain plants in conveying the pollen from one flower to another. Another remarkable fact in this connection is that almost all flowers which are thus fertilized are gaily colored so as to be attractive to insects, and Mr. Darwin observes that he knows of no flower fertilized exclusively by pollen blown on the wind, that has not a dull unattractive appearance.

COFFEE-TEA.—We have made frequent mention of the experiment which, if reports are true, has been highly successful, of raising the true Chinese tea-shrub in our Southern States. An exchange calls attention to a new branch of industry in this line, which is capable of still more extended cultivation. It is customary in Sumatra to use the roasted leaves of the coffee plant for the production of a drink having

all the properties of the best of tea, and containing nearly 1.35 per cent. of its peculiar principle. The preparation of the leaves is much simpler than that required for the true Chinese tea, and the cultivation of the plant can be carried on in more northerly countries, where the coffee berry itself would never fully ripen.

A NOVEL MODE OF PASTURING SHEEP.—A grazer in the Pas de Calais, named Pentefort, has introduced the following singular method of economizing his green crops: Over the whole field is placed a rack or fence, so made that the sheep cannot jump over it, but must feed between the bars; and when all the herbage within their reach is consumed, the rack is moved forward, so as to give them a fresh supply of forage. Regularity in cropping and great economy result from the employment of this singular system.

CARBONIC ACID BATHS.—At Piermont, in Germany, there is a natural spring of carbonic acid gas, the sides of which have been walled up, and steps laid for entering it. The well is shallow, and the gas fills it to a depth of about four feet, so that the gas rises about to the middle of a person standing in the well. The effect of the gas in contact with the skin is said to be a peculiar prickling sensation, but not so unpleasant but that such baths have come to be very much in vogue.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

Samples of ore from the Industry silver mine, in Maine, have been assayed by the Massachusetts States assayer and found to average 8 ounces, 50 grains of silver per ton. An interesting fact regarding this mine is the discovery of silver in magnetite, and white or gray pyrites.

From a list of railroads in California, prepared by the Secretary of the Interior, it appears that up to July 1st, 1867, there were a fraction less than 300 miles of railroad track completed and in running order in that State, with an additional length of 1,142 miles, now being constructed.

Machine belting is manufactured by Messrs. Crane, at Dalton, Mass., and is in use in several New England mills. One of these paper belts measures seventy-five feet long and eight inches wide. Patents have been secured in foreign countries for this invention, through this office, and the article promises to become the subject of much importance.

Notice has been served on the workmen in the iron trade in Middlesex and the Tees District, Darlington, Wotton Park, and other parts of the north-east of England, that the masters intend to reduce their wages on the 7th of December. The notice has been issued in consequence of a meeting of the Ironmaster's Association, at Newcastle-on-Tyne, and it is thought that the reduction will average about ten per cent. The men at the Albert Works, Darlington, have accepted a reduction.

The survey of another trans-continental railway route, which shall follow mainly the thirty-fifth parallel of latitude, is nearly completed. Its projectors claim this as the most feasible one across the continent, and even if the Northern and Southern roads are constructed, this would still be the favorite popular thoroughfare, and the easiest and cheapest built.

From lack of economy, in production of ores, it is estimated that the aggregate loss on the production of bullion of this country for the present year, will reach the round sum of \$35,000,000.

Many of the very best locomotive builders in France and Belgium still adhere to the plan of packing their cylinder heads with wire gauze and red lead paint, an antiquated practice long since discarded in both this country and England.

In Brazil, Clay county, Indiana, there is found a species of coal which in appearance and gravity resembles charcoal, having even the woody fibre of the latter. So valuable is it for smelting purposes that one furnace in St. Louis is using five car loads a day, and its existence needs only to be known to increase the demand from other establishments indefinitely. In the same neighborhood is also found an abundance of native iron ore of a superior quality, and a number of iron men from Ohio and Pennsylvania have lately been investing heavily in real estate, and the erection of mills and furnaces in this section.

During last year there were 181,669 tons of new, and 235,334 tons of re-rolled rails made in the United States. During the same period we imported about 700,000 tons, making the total consumption of rails in 1866, 517,993 tons of 200 lbs.

It has been calculated by Prof. Breithaupt that during the six hundred and forty years, dating down to 1825, which the mines of Freiberg have been worked, not less than eighty-two thousand hundred-weight of silver have been raised, and that the amount yielded in 1820 alone was not less than eight hundred thousand thalers.

There remains to be built to complete all railroad communication across the continent, 1,070 miles of road. As about 700 miles have been built within little more than two years, it is not unreasonable to expect that the remainder will be completed in the time anticipated—say in 1870.

Our Canadian neighbors are now very much exercised over the selection of a route for the new intercolonial railroad, which is to bind the various members of the new Dominion more closely together. The road is to run from Quebec to Halifax, through the lower part of what was Lower Canada, but now called the Province of Quebec; New Brunswick and Nova Scotia. Three routes have been proposed, and consequently the war of local interests runs high. Of these, the frontier line runs through the most thickly settled regions, but in case of war with us, the Canadians fear the road would be easily destroyed. The same reason holds good against the second or central route, the northern route being preferred by the Government officials. Toward the construction of the road, the English Parliament is to guarantee a loan of \$15,000,000, which will probably cover the cost of construction.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

MANUFACTURE OF STEEL.—James B. Bradley and Moses W. Brown, Chicago, Ill.—This invention relates to an improved process for manufacturing steel of various kinds and grades, and consists in improvements in the composition of mixtures for treating malleable iron.

HOISTING JACK.—S. B. Rittenhouse, Plymouth, Ind.—The object of this invention is to provide a small and portable machine through which a very great power may be obtained for the purpose of hoisting heavy weights, or propelling heavy bodies, or exerting a great force in any direction, as propelling a ditching machine, or a plow for laying drain tile.

INHALING TUBE.—Samuel W. Sine, Easton, Pa.—This invention relates to an instrument which is used for inhaling gas, or anesthetic agents for producing insensibility in surgical, dental, and other operations, or for other purposes.

ROOT-TREE.—F. S. Wilt, Allentown, Pa.—This invention relates to a method of constructing root-trees, and the invention consists in an arrangement whereby the leg and foot of the boot are tread or expanded simultaneously, by operating a single lever nut on the upper end of the tree.

IMPROVED AUTOMATIC RAIN CONDUCTOR.—James B. Hudson, Fayetteville, N. C.—This invention relates to an apparatus for conducting water into cisterns or tanks, and has a conducting disk to oscillate on pivots, and connect-

ed with a float, whereby the said disk is made to reverse its angle of inclination and deliver the water into a waste pipe, when the water in the cistern reaches a certain point.

ASH HOUSE.—Moses Hall, Osborn, Ohio.—This invention consists of a hopper and screen upon a fire-proof ash box, and the whole placed upon a leach tub; said leach tub being provided with a screen or perforated plate through which the lye passes off.

CASE OR BOX FOR PRESERVING CORPSES.—F. Wendtler, Rockville, Conn.—This invention relates to a case or box for the preservation of corpses, which box or case is constructed in a novel and peculiar manner, whereby it is rendered extremely efficient and desirable, as well as serviceable, for the purpose intended.

GENERATING AND SUPERHEATING STEAM.—George Miller, Melbourne, Victoria.—This invention relates to the manner in which steam is generated and superheated, and to the means by which the pressure of the steam is regulated, and also to the manner in which the temperature is concentrated, and consists in providing, in connection with a furnace or fire-box, generating pipes or tubes wherein the water enters and is converted into steam, and also superheated.

PLOWS.—S. J. Leach, Tuscaloosa, Ala.—This invention has for its object to furnish an improved plow provided with a detachable facing formed of wood, or other material, to which adhesive soils will not adhere and clog the plow, which shall be cheap, more durable, and more effective than the plows ordinarily used in such soils.

LAND CONVEYANCE.—G. F. Krollpfeiffer, New York city.—This invention relates to an attachment for sleds, sleighs, and other classes of land conveyance, whereby sleds or sleighs can be propelled over the ground or other surface by means of the direct action upon the ground of a lever or levers, so hung to the body of the sled or other vehicle as to be suitably operated by a person or persons within the same, or by other power, either hand or mechanical.

BOAT LOWERING APPARATUS.—A. F. Crossman, Lieut. Commander, U.S.N.—This invention relates to a new and improved means for detaching boats from davits, and it consists in a novel manner of applying the davits to the vessel, whereby the former may be made to project out from the vessel, more or less, as required, in order to prevent the boat, while being lowered, being thrown against the side of the ship by the action of the waves.

LANTERN FOR STREET RAILROAD CARS.—L. V. Badger, Chicago, Ill.—The invention is to obtain a signal lantern for street railroad cars, which may be applied to any car without difficulty, be readily changed from one car to another, and have the advantage of being capable of adjustment in a mere conspicuous place than those now used.

STOVEPIPE DAMPER.—D. Mannel, Boston, Mass.—This invention relates to an improvement in the construction of dampers for stovepipes and consists in two cast-iron disks which have flat central surfaces and are interlocked so that they lie close together when united by the pivot suspension rod of the damper; they have fluted or corrugated edges which overlap the opposite corrugations on the opposite disks and form concave radiators above and below so related to each other that the smoke and heated gases can enter therein from below and receive a reverse movement which deflects them against the stovepipe thus imparting more heat to the air in a room before finally escaping.

DRESSING MILL STONES.—Notley W. Wortham, Union Point, Ga.—This invention relates to an improved mode of dressing mill stones for grinding Indian corn and other grain, whereby there is a large gain in the grinding capacity of the stones over the ordinary methods of dressing the stones and a superior quality of meal is produced.

RAILROAD WEED CUTTER.—J. S. Boicourt, Boonsboro', Iowa.—This invention relates to an improvement in a device for cutting weeds on a railroad track and consists in attaching cutters either circular or straight to the truck of a car, which are worked by gear deriving its motion from the wheels of the car.

HEDGE TRIMMER AND CORN STALK CUTTER.—John W. Hull, Connerville, Ind.—This invention relates to an improvement in the construction of a machine for trimming hedges and cutting down the stalks of corn in the field, and consists in a frame mounted on wheels and drawn by a team, an adjustable rotary cutter being connected with gearing moved by one of the wheels for trimming the top and sides of a hedge and a detachable cutter being placed on the frame when required for cutting corn stalks as the machine travels.

LAMP CHIMNEY CLEANER.—George Lea, Shireysburg, Pa.—This invention relates to the construction of an improvement for cleaning lamp chimneys, and consists in a curved metal rod having a serrated conical disk or cap on one end by which a bit of paper, cloth, or fibrous substance of any suitable kind for wiping, cleaning and polishing a lamp chimney may be introduced.

TURNING SPOOLS, BOBBINS, ETC.—David Dick, Corning, N. Y.—This invention relates to a machine for turning spools, bobbins, and other wooden articles of a similar character and has for its object rapidity of execution and an automatic operation of the several parts throughout.

COMBINED SHOVEL AND SIFTER.—D. Boynton, St. Johnsbury, Vt.—This invention relates to a combination of a fire shovel and sifter, and it consists in providing a shovel with a supplemental bottom in which a screen is inserted, the bottom being so arranged or disposed within the shovel as to admit of a separate discharge for the ashes and the shovel provided with a lid or cover, all being arranged in such a manner that the ashes may be shoveled up and the cinders separated from it and the ashes discharged from the shovel so as to leave the cinders clean and in good condition to be placed upon the fire whenever required.

SPRING BED BOTTOM.—George Widdcomb, Grand Rapids, Mich.—This invention has for its object to furnish an improved bed bottom, simple in construction, very elastic and wholly without noise when in use.

PRESERVING EGGS, MEATS, ETC.—Charles Boize, New York city.—This invention consists in the use of argillite or argillaceous schist or slate finely powdered as a medium or means of packing or surrounding the eggs or other articles, whereby they are enabled to be preserved and maintained fresh and suitable for being transported from place to place without becoming deteriorated or rendered useless. The slate employed is susceptible of use over and over again and not in the least becoming deteriorated.

BELT-FASTENER AND TIGHTENER.—Charles O. Pike, North Leverett, Mass.—This invention relates to a device for fastening the ends of a belt, and for tightening it, and the improvement consists in a clamp for holding the ends of the belt together, and a lever arrangement fitted to the clamp for tightening the belt.

SEED-PLANTER.—William R. Mosier, Hagginsville, Ill.—This invention has for its object the furnishing of an improved seed planter, so constructed as to furrow the ground and drop and cover the seed; and which, by removing the sub-dropping device, may be used to cultivate the crop.

INSIDE WINDOW-BLENDS.—S. W. Shorey, Galesburg, Ill.—This invention relates to a method of constructing and operating inside blinds for the windows of dwelling-houses and public buildings, and it consists in the peculiar manner in which the slats forming the blind are connected together, and the manner in which they are closed and secured in a closed position.

EXCAVATOR.—B. T. Stowell, Quincy, Ill.—This invention relates to a new method of constructing excavators and ditching machines.

SAIL SAFE.—F. G. Oehme, Plymouth, Mass.—This invention has for its object to prevent the capsizing of sail-boats, by securing the sail with an apparatus which may be set so as to release the sail when the pressure has reached the amount that the sail and boat can bear.

CULTIVATOR.—Henry Howe, Oneonta, N. Y.—This invention has for its object to improve the construction of cultivators so as to make them more convenient in operation.

EQUILIBRIUM BALANCE FOR SAFETY-VALVES.—Virgil D. Green, Watertown, Wis.—The object of this invention is to overcome the rigidity of the spring in the spring balances in common use.

WASHING-MACHINE.—Thomas Q. Frost, Indian River, N. Y.—This invention relates to a machine for cleansing or purifying linen and other clothes or

articles of a similar nature. The invention consists in operating stampers or dashers within the washing-tub, and also in attaching to the tub rollers which are made to act as a wringer for the clothes, and which form a part of the tub.

TUG OR TRACER-FASTENER.—Ira McAllister, Milo, Mich.—This fastener or buckle consists of a frame having side-guards, which frame is fastened in any suitable manner to the outer end of the hame-strap, along its length, so that the tug or trace-strap can be drawn through it from end to end, and there secured by inserting a tongue into the proper aperture; that is at one end of a lever arranged to slide upon a cross-pin between the side-guards and in the direction of the length of the frame, wherein such tongue is fastened by running the opposite end of the lever up over the end of the frame, where the tug or trace enters.

HAND BINDING HARVESTER.—G. H. Spanning, Rockford, Ill.—This invention consists of a box or grain receptacle, placed on the platform into which the grain enters through the bottom, being carried therein by the action of the rolling apron, forming part of the platform. The peculiar construction of the apron conduces to the perfect working of the device.

FLOW.—Andrew Gilmore, Phoenixville, Pa.—The invention is limited to a new and improved device for preventing the clogging, and in connection with this, an adjustable handle.

TABLE CUTLERY.—N. W. Coughy, Baltimore, Md.—In this invention the knife or fork is made adjustable, and extensible in the handle, so as to serve for use at both the dinner and tea table.

WATER WHEEL.—Henry W. Shipley, Portland, Oregon.—The object of this invention is to obtain a wheel which will utilize the power of small streams of water to a degree not hitherto attained.

COFFEE POT.—John Zimmerman, Royallton Centre, N. Y.—In my improved coffee pot the coffee is subjected first to the action of the steam as it rises from the water in the pot to the condenser, and afterwards to the action of the condensed water flowing back to the pot from the condenser.

POTATO DIGGER.—Thomas W. Shepard, Hennepin, Ill.—In this invention a new form of mold or plow is used, and a new arrangement for regulating it, by which greater results are obtained with less power than in any other machine for the purpose.

STEAM COOKING APPARATUS.—John Zimmerman, Royallton Centre, N. Y.—In this invention a large number of cooking vessels are so constructed that they can be arranged one above another in a vertical cylinder, and a variety of materials, vegetables, meats, pastry, cakes, etc., can be cooked at the same time in the cylinder without interfering with each other, and with a single application of the steam.

REGISTERING YARD STICK.—W. P. Lupton and C. M. Talbot, Cadiz, O.—In this invention the operator registers the number of yards measured by pressing a knob projecting from the side of the stick under his finger as he measures each yard. The number of the tally is indicated by figures appearing through a small aperture in the back of the yard stick.

AUTOMATIC STEAM VALVE FOR INJECTORS OR FEEDERS FOR STEAM BOILERS.—Richard Gornall, Baltimore, Md.—This invention is a new device designed to be applied to a steam boiler, whether connected with an engine or not, and automatically to regulate the flow of steam from the boiler to a pump or injector, the steam thus escaping being used to work the pump or injector, and feed the boiler, entirely independent of the action of an engine.

SCHOOL DESK AND SEAT.—C. Thurston Chase, Albany, N. Y.—In this invention the seats and desks are so supported that each one is connected with all before and all behind it in the row. The same construction which affects this object renders the seat much easier to enter and leave. The seats are also provided with hinged bottoms, opening upward and inward.

TIDAL OR SELF-ACTING ELEVATOR.—Philip Week, Brooklyn, N. Y.—This invention relates to a device for elevating water and other articles by the rising and falling of the tides, and is designed to be perfectly self-acting, and to effect a great saving in labor and expense in elevating articles in places where the tides ebb and flow in any material degree.

WASHING MACHINE.—G. Beneky and J. Keiss, Cedar Falls, Iowa.—This invention has for its object to furnish an improved washing machine, simple in construction, easily operated, and doing its work quickly and thoroughly.

CULTIVATOR.—C. G. Petengill, Hebron, Me.—This invention has for its object to improve the construction of cultivators so as to make them more easily adjustable, and more effective in operation.

CLEANING BOILER FLUES, ETC.—Joel M. Wheeler, Oxford, Conn.—This invention has for its object to furnish an improved means for cleaning the tubes, flues, tube boxes, etc., of steam boilers easily, conveniently, and thoroughly, which may be applied without hauling the flues, or while the ship is under way, and which cannot injure the flues, or cause them to leak.

WASHING MACHINE.—John Mitchell, Newark, Ohio.—This invention relates to an improved washing machine, and consists in the insertion of ribs in the end of the machine, between which and a vibrating weighted dasher provided with pounders alternating with said ribs, the clothes are squeezed, and effectually washed and cleansed.

CAR COUPLING.—A. Hillman, Stratford, C. W.—This invention has for its object to furnish an improved car coupling, simple, strong, and reliable in construction, not liable to get out of order, which shall be self-coupling, and which may be readily attached to an ordinary draw bar and bumper head.

HARROW.—John Aiken, Warner, N. H.—This invention has for its object to furnish an improved harrow, so constructed and arranged that it will adjust itself to pass over roots, stones, or other obstructions, without having to be raised from the ground; that it will relieve itself of rubbish, and that it may be made light, while at the same time it will do its work better than the ordinary heavy harrows.

HAY FORK.—J. S. Gochbauer, York, Pa.—This invention relates to an improvement in hay forks, in which two tines are made in one piece, two lifting tines being employed which are simultaneously operated by means of an oscillating bracing roller and a spring lever.

SORGHUM EVAPORATOR.—Noah Clouse, Buffalo Village, Pa.—This invention relates to a new sorghum evaporator, which is so arranged that the sorghum goes through the whole process in separate vessels, so that each vessel can be cleaned after it has been emptied, and can be made ready for further operation without stopping or retarding the process in the other vessels.

STEAM ENGINE GOVERNOR.—Oliver A. Kelly, Slatersville, R. I.—The object of this invention is to obviate the violent changes and consequent fluctuations in the quantity of steam admitted to the piston, and is especially designed for engines that are regulated by the main valves.

IRON SAFE.—William Gardner, New York City.—This invention consists in a novel construction of the door of a safe, which is so made as to more effectually resist the action of fire and burglars, and also in the employment of a false bottom for the purpose of conveniently and securely fixing the safe to the floor of the chamber in which it is placed, without affecting its fire and burglar proof qualities; also in an arrangement for more securely locking the door to the case or frame of the safe.

LOCK.—Jacob Wertheim, La Grange, Ind.—This invention has for its object to furnish an improved lock, strong, durable, and simple in construction, which cannot be picked, and of which no impression can be taken to enable a false key to be made.

TRUNK.—Thomas Smith, Brooklyn, N. Y.—This invention relates to a new extension trunk, which is provided with a tray or trays having hinged bottoms, which tray can be secured in an inverted position upon the cover of the trunk, extending the same and forming a new compartment for packing goods. The bottom of the tray becomes in this position the cover of the trunk extension.

SEAT RISERS FOR VEHICLES.—John B. D. V. Linton, New Bedford, Mass.—This invention relates to a new kind of seat risers or seat legs now used on wagons, carriages, sleighs, and vehicles of any description. The invention consists in the use of cast metal risers in place of the ordinary wooden risers or supports, such risers, when made of cast metal, possess great and important advantages over wooden ones, in beauty, convenience, and cheapness.

SEED PLANTER.—John Stark, Thomasville, Ga.—This invention relates to a new machine for planting all kinds of seed, from the largest to the finest sows, and for spreading pulverized manure, as well as for preparing the ground for the reception of the manure and seed and for covering the furrows made and for rolling the land.

BURIAL CASE.—Robert F. Hill, Philadelphia, Pa.—This invention relates to a new manner of constructing burial cases so that they will be strong and commodious. The invention consists in making the cover hollow, and not flat, as usual, thereby permitting the body of the case to be shallower, and the consequent better display of the face and head of a deceased person. The head can then be laid upon a pillow, so as to project above the case, and will still not come in contact with the lid when the same is closed.

CHECK REIN ATTACHMENT.—M. A. Gates, Troy, Pa.—This invention has for its object to furnish an improved check rein attachment for harness, so constructed and arranged that the horse can be unchecked or allowed to drink without its being necessary for the driver to get out of the carriage. The invention consists in a strap running along the back strap of the harness guide rings attached to the back strap. To the forward end of the said strap is attached the check-rein hook, and to its rear end is attached a ring which, when the horse is checked up, is dropped over a hook attached to the rear part of the back strap or to the crupper strap. The ring of this strap is removed from the hook to allow the horse to drink and attached to it to check him up by means of a small hook attached to the but end of the whip.

LOCOMOTIVE LINK.—Thomas J. Rowley and Wm. Poland, Chillicothe, Ohio.—This invention relates to an improvement in the construction of links for locomotive and other engines, and consists in a link formed of a single bar on which the box alides, which bar is stiffened by a side bar connected with the tumbling shaft.

HANGING WINDOW, SHUTTER, DOOR, OR VENTILATING FRAMES TO CARS, ETC.—Wm. B. Dunning, Genesee, N. Y.—This invention consists in so hanging a window, door, or ventilating frame within the body of a car or other land conveyance, that it can be swung in either direction, that is either on the right or left, according to the direction in which the car, etc., is moving or as may be desired, to allow ventilation and at the same time prevent the entrance of dust to the inside of the car.

NUTTING GRATER.—W. W. Owen and D. C. Kelly, Muskegon, Mich.—This invention relates to a grater for grating nutmeats and similar substances, and consists of an L or T shaped pipe of tin or other metal with a spiral spring soldered at one end to a perforated grater plate which fits into the pipe; a small thumb rod is fastened to this grater and passes through the cross piece of the pipe. A grater wheel moves round on a wire axis secured to a plate borne on the pipe.

NEW PUBLICATIONS.

TODD'S YOUNG FARMER'S MANUAL, Vol. 2. How to Make Farming Pay. By S. Edwards Todd.

With full practical details of farm management, character of soils, plowing, management of grass lands, manures, farm implements, stock, drainage, planting, harvesting, etc. One handsome post octavo volume, beveled boards, finely illustrated, and contains upwards of 400 pages. Post paid, \$3.50.

Also a new edition of **TODD'S YOUNG FARMER'S MANUAL, Vol. 1: The Farm and the Workshop**, with practical directions for laying out a farm, erecting buildings, fences, farm gates, selecting good farm and shop tools, and performing farm operations. Fully illustrated. One handsome post octavo volume, beveled boards, 496 pages. Post paid, \$3.50.

Each volume distinct by itself, and sold separately. The experienced practical farmer will find the above works useful to him, although the author intends them more especially for the young farmer, as their titles indicate. The works are both copiously illustrated, showing improved farm tools, implements for cultivating the soil, fences, etc. The above works are both published by F. W. Woodward, at the office of the *Horticulturist*, 87 Park Row, New York.

PHOTOGRAPHIC MOSAICS. For 1868. Philadelphia: Bennerman & Wilson.

This excellent little annual, by M. Cary Lea and Edward L. Wilson, is brimful of choice extracts relating to improvements and best suggestions in photography.

THE SCHOOL DAY VISITOR.

A monthly magazine for the young, has been enlarged and improved \$1.25 a year. Published in Philadelphia, Pa.

ATLANTIC MONTHLY. Boston: Ticknor & Fields.

The December number is just out. For sale by all the news vendors. Subscription price \$4 per annum.

THE BOSTON WEEKLY ADVERTISER.

This excellent journal has entered upon a new volume—its fifty-eighth—and comes to us enlarged and improved, in quarto form, headed *The Thursday Spectator and Boston Weekly Advertiser*. We are glad to observe that prosperity and progress still attend the efforts of its proprietors.

LEAF PRINTS. By C. F. Hines. Philadelphia: Bennerman & Wilson.

This is a neat little volume illustrating a very simple method of copying the forms of all kinds of leaves. The process consists substantially in making a photographic print of the leaf upon paper so prepared as to be sensitive to light. The method of preparation and printing are exceedingly simple and may be practiced by ladies. The results are very beautiful.

HISTORY OF THE MICROSCOPE.

Probably no person has contributed more towards the popularization of the microscope than Dr. Hogg, whose book bearing the above title has been ten years or more before the public. The present is a new and enlarged edition, rewritten and greatly improved. It is illustrated with some five hundred engravings explanatory of the construction of the microscope, views of the different styles manufactured, illustrations of their use, of the methods of preparing specimens, dissection, mounting, collecting, etc. Nothing could be more complete for the student or observer than the instructions of this valuable work. The wonders revealed by the microscope are both astonishing and endless. The study is most fascinating, while as an amusement for the leisure hour it is not only delightful but beneficial. If our young men and women could be induced to devote but a small portion of the time now wasted in gossip, idle conversation, or dissipation, to instructions such as may be easily realized from the microscope, they would make rapid advances in social and mental improvement. Dr. Hogg's book is probably the most popular of any upon the subject. Fifty thousand copies have been sold. The new edition is published by Routledge & Sons, 416 Broome street, N. Y.

A HISTORY OF WONDERFUL INVENTIONS. By John Timbs.

This will be found a most readable and valuable book. Every person who aspires to be well informed ought to be posted concerning the great inventions of modern times, their nature, names of the inventors, date, their progress and value. The accounts here presented concerning the early history of the mariners' compass, the barometer, the art of printing, the telescope, warfare, illuminating gas, steam engine, machine weaving, electric telegraph, and other inventions, each seem to form a separate romance of rarest interest. We wish that the facts concerning these things, their authors and projects, could be generally fixed in the minds of young men. They could draw from them many lessons of encouragement and cheer, as showing how the men of toil in former days worked out the greatest problems of science and achieved the most extraordinary success. Beautifully illustrated. Published by Routledge & Sons, 416 Broome street, N. Y.

THE FAMILY SAVE-ALL.

This is the title of a new book relating to the economy of the kitchen, the larder, and the household generally. It contains the best recipes for cooking, from the smallest dishes up to the most difficult, with directions for the saving and relief of very many substances that are commonly wasted. It is proverbial that people waste more than they consume. If the directions for family economy here presented were generally observed in this country, the resultant saving would be sufficient to pay off the national debt in less than five years. Price \$2. Published by Peterson, Philadelphia. Sold by the New York News Company.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

All references to back numbers should be by volume and page.

J. B. of La. says: "I observe in your issue of Nov. 30th a notice of the presentation of a glacial theory by J. W. Reid, in which he advances the idea that the temperature of the northern hemisphere has been decreasing for 300 years. Is this correct? I thought the contrary was the case and that our winters were milder than those known to our forefathers." It is very common to hear accounts from the oldest inhabitants of the severity of winters in days gone by, but the average yearly temperature for a century past would, we doubt not, show a slight gradual decrease, and the remains of animals and plants which now flourish in tropical regions prove without doubt that the temperature of the northern hemisphere was once warmer than at present. This is not at all inconsistent with the supposition that it was also, at some time, colder than at present, for in looking into this subject we must deal with ages and not years.

J. H. B. of Pa. asks: "How many gallons of water will be required per minute to run machinery demanding 60 H. P., with an over-shot wheel of 15 feet diameter? How many gallons of water will a water wheel of 60 H. P. raise per minute 60 feet high with the best pump now in use?" 75 gallons per second falling through one foot is a horse-power; that is 75 x 60 = 4,500 gallons per minute must fall through one foot for a horse-power, and this quantity falling through 15 feet will give 16 H. P. Hence for 60 H. P. 4,500 x 15 = 67,500 gallons are necessary; add to this about 25 per cent for friction, waste, etc., and you will have the required amount. As a horse-power is 33,000 lbs. raised one foot high in one minute the second query can be answered by simple calculation. Deduct from the result about 15 per cent for friction of pump, loss, etc., and the amount of water 60 H. P. will raise 60 feet high will be given.

G. W. G. of Pa. asks for a cement to secure the brass tops to carbon oil lamps. We have never found any difficulty with a cement of plaster of paris. The tops of all kerosene lamps are thus secured.

R. H. of Ohio, says, in relation to preventing scale in boilers—without injury or foaming—that the Anti-Incrustator Powder of H. N. Winans, 11 Wall street, New York City, is the most reliable article he has ever heard of and the cheapest.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Parties in want of Fine Tools or Machinists' Supplies send for price list to Goodnow & Wightman, 28 Cornhill, Boston, Mass.

Pattern Letters and Figures for inventors, etc., to put on patterns for castings, are made by Knight Brothers, Seneca Falls, N. Y.

Allen & Needles, 41 South Water street, Philadelphia, Manufacturers of Allen's Patent Anti-Lamins, for removing and preventing scale in steam boilers.

Will the Patentee or Manufacturers of Collins's Sunburner Lamp send a circular and price list of their lamps and chimneys to fit them to W. B. Beckwith, Franklin, Venango county, Pa.

Parties desirous of saving fuel, expense of cleaning, and corrosion of boilers, will find the remedy in H. N. Winans's anti-incrustation powder, 11 Wall st., N. Y.; twenty thousand references prove it reliable and unobjectionable.

Manufacturers of Portable Steam Engines and Threshing Machines will send circulars to Walker Reynolds Alpin, Talladega county, Ala.

The Safety Lamp Attachment can be applied to any Lamp. Inflammable gases banished. Lamps filled without removing the chimney. Price 25c. By mail 50c. Address Novelty Machine Co., Box 208 Troy, N. Y.

Important to Capitalists.—Thos. Cooper offers for sale at a great bargain a patent mill for making railroad-car axles, which will also roll cold iron, and straighten and polish any kind of shafting. Circulars with full particulars, sent on application to Thos. Cooper, Box 2677, Cincinnati, Ohio.

Wanted—Two new or second-hand steam excavators. Address, with full particulars, S. M. Barrett, Sup't S. & F. R. R., Shelbygan Wis.

Manufacturers of Fancy Glass Goods will please send their address to J. Martin, Box 216 Cairo, Ill.

J. Hexter, Vancouver, W. T., wishes to obtain a first-class turbine.

Wm. Hanser, M.D., Bartow, Jefferson county, Ga., wishes to obtain a good stump puller and a buggy plow.

EXTENSION NOTICES.

Chauncey D. Woodruff, of Toledo, Ohio, having petitioned for the extension of a patent granted to him the 7th day of March, 1854, for an improvement in suspending eave troughs, for seven years from the expiration of said patent, which takes place on the 7th day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 17th day of February next.

James H. Sweet, of Pittsburgh, Pa., having petitioned for the extension of a patent granted to him the 14th day of March, 1854, for an improvement in hanging of the gripping jaw of spike machines, for seven years from the expiration of said patent, which takes place on the 14th day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 24th day of February next.

Ellsworth P. S. Goodyear, of North Haven, Conn., having petitioned for the extension of a patent granted to him the 30th day of March, 1854, for an improvement in processes for treating india-rubber, for seven years from the expiration of said patent, which takes place on the 29th day of March, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 9th day of March next.

Henry B. Myer, of Cleveland, Ohio, having petitioned for the extension of a patent granted to him the 19th day of September, 1854, renewed the 3d day of May, 1858, and again renewed the 9th day of October, 1861, for an improvement in converting railroad car seats into beds or lounges, for seven years from the expiration of said patent, which takes place on the 19th day of September, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 23rd day of May next.

Willie Humiston, of Troy, N. Y., having petitioned for the extension of a patent granted to him the 4th day of April, 1854, and renewed the 6th day of March, 1865, for an improvement in candle mold apparatus, for seven years from the expiration of said patent, which takes place on the 4th day of April, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 18th day of March next.

BOILER EXPLOSIONS—WHAT CAN BE DONE TO PREVENT THEM.

The occurrence of several disastrous boiler explosions since we last referred to this subject, demands that we should again direct attention to this constant cause of the destruction of life and property. We have before us a large pile of letters on boiler explosions, the accumulation of several months; in these letters there is scarcely a word said about bad workmanship, bad material, improper design or carelessness or management. But the gas, electrical, and explosive compound theories are presented in nearly every conceivable way to account for these boiler catastrophes continually occurring. All these vague and useless, nay, positively injurious speculations should be discouraged in every possible way. They simply tend to distract attention from causes of a purely mechanical nature which are entirely within our control; further than this, this "mysterious agency" business is not unfrequently used by the blunderers who have built bad boilers, and employers who have hired incompetent attendants and who have used boilers which were known to be out of repair, or who have used them for long periods of time without having had them properly examined by competent persons, to shield them from the punishment which is their just due. Just as soon as the public are persuaded into belief in the opinion which is persistently urged in some quarters that boiler explosions are produced by inscrutable causes or that they are to be accounted for by some incomprehensible theory, just so soon will the time be at hand when the coroner's inquest or the victims of an explosion will be even a greater farce than it is now. And we intend to exert our influence to prevent the existence of this state of affairs which threatens us in this matter. No sooner does a boiler explosion occur than a bevy of boiler explosion theorists crawl out of their holes and either deluge the press with long-drawn theories or cunningly manage to be called as witnesses by the coroner whom they deceive by their pedantry, and in many cases prevent a proper examination into causes which, of course, tends to shield the culprits from punishment or censure.

We have no objections to, but on the contrary encourage speculation in abstract science, the nature of force and matter are fair subjects for the speculative philosopher, but when practical matters are to be examined into, common sense and analytical investigation is what is demanded, not desultory speculation.

As the hydrogen gas theory is now in full blast, perhaps it may be well to devote a little attention to it and exhibit its fallacy. Hydrogen gas can only be generated in steam boilers by the decomposition of the steam or water, and it is easy to show that no such decomposition can possibly occur, to any extent worth mentioning, under any conditions arising in the use of steam boilers; and beside, if such decomposition did occur, the hydrogen so generated would have no oxygen to combine with, a condition absolutely indispensable in order that it may form an explosive compound. And still further, even if there was a sufficiency of oxygen at hand, the presence of the steam would preclude the temperature, necessary for ignition, from being reached. Let us see what the late Professor Faraday says on this point. An apparatus having been introduced to superheat steam, by passing it through iron tubes which were placed directly in the furnace, where they could, of course, be made red hot, it was thought by some that the steam would be decomposed, that an explosive compound would be formed, and that consequently the apparatus was unsafe, and should not be used. This eminent physicist says "that as respects the decomposition of the steam by the heated iron of the tube, and the separation of hydrogen, no new danger is incurred. Under extreme circumstances the hydrogen which could be evolved would be very small in quantity—would not exert a greater expansive force than the steam—would not with steam form an explosive mixture—would not be able to burn with explosion, and probably not at all if it, with the steam, escaped through an aperture into the air, or even into the fire place. Supposing the tubes were frequently heated over much, a slow oxidation of the iron might go on within; this would be accompanied by a more rapid oxidation of the entire iron surface, and the two causes would combine to the gradual injury of the tube."

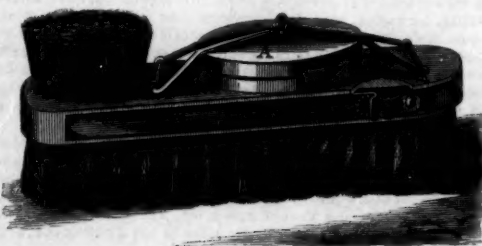
These facts thus clearly set forth effectually dispose of this "mysterious" cause, and at the same time it points out that if any portion of a boiler not covered with water is exposed to a high temperature from the furnaces slow oxidation of the iron is likely to go on, and then the boiler in that part may gradually become deteriorated or decayed until it can no longer stand the pressure on that part, and away it will go. But this is certainly a cause which can be prevented by proper vigilance, the part repaired, and if necessary protected from the action of the fire. And this leads us to consider the fact that if a boiler is so planned that proper circulation of the water over the heating surfaces is prevented, those parts in direct contact with the hottest part of the fire, are liable to be exposed to its action, while, instead of being covered with water, they are simply enveloped in a layer of steam, which not only is a bad conductor of heat and consequently permits the metal to be overheated, but also allows it to be deteriorated by oxidation. This state of affairs can and has existed in boilers whose gage cocks showed an ample supply of water. Hence those boilers which do not allow for an unobstructed departure of the steam bubbles from the heating surfaces, and for a circulation that will always keep those surfaces in contact with solid water are positively dangerous and should not be permitted to be used. We might mention several cases in our experience which bear on this point and conclusively show the great danger which may be incurred from this cause, but want of space warns us that we must proceed

to the point it is our desire to impress upon our readers, and that is that boiler explosions with their appalling consequences are becoming so very frequent that practical measures are at once demanded, to at least diminish their frequency, if indeed they cannot be wholly prevented. We need scarcely remark that the first step which should be taken in this direction is to remove those causes, which it is known do produce the horrible disasters which makes one shudder to think of, and which are almost daily to be seen in the papers. These causes, we again repeat, to be bad workmanship, bad planning, incompetent attendance, deterioration, bad iron, and inoperative safety valves. We think that all of our readers will agree with us that these fruitful causes are almost wholly within our control. Legislative action we do not believe can wholly remove them, bad planning, bad workmanship and bad iron it certainly cannot, but we believe that much good may be effected by the passage of a law with respect to the competency of those who are to be allowed to have charge of steam boilers, and by providing for rigid periodical inspection prevent much of the danger from deterioration or corrosion, and we are sure that a law compelling the use of proper lock up safety valves on stationary boilers cannot fail to add to the security of the public.

But after all, let our legislation do their best, and pass the most perfect laws on this subject that can be enacted, yet we are confidently of the opinion that much more good is to be accomplished by Boiler Insurance Associations. In this, that important element, self interest, is made to act in a much more powerful manner than can be brought about by any system of legal inspection, no matter how rigid its provisions may be, or how carefully it is drawn up. The self interest of a corporation will be sure to discover flaws and causes of danger which will escape the less interested inspection of a paid official.

PARET'S IMPROVED BLACKING BRUSH.

A combination of brush, blacking, and mud scraper, forming a very compact and handy contrivance for household or

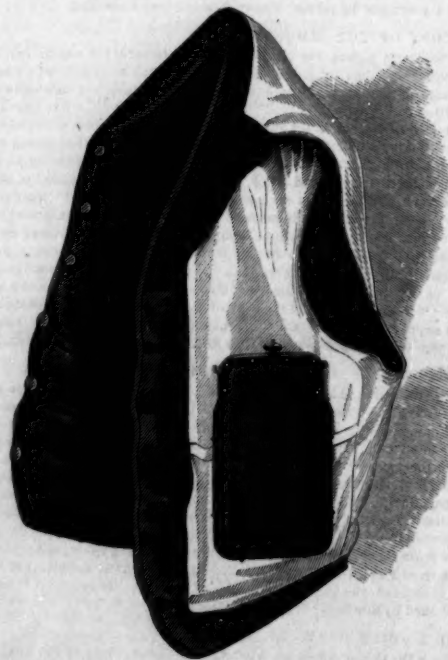


traveling use is presented in the accompanying engraving. A few words will explain its construction. The blacking box, A, is held in place, when not in use, by an endless elastic band, secured by hooks, which, being open at the shanks, permit the replacement of a new elastic for a worn out one. In a recess, in the side of the brush, slides a metal scraper, B, held in place by the spring, C. Thus we have combined, all the appliances for cleaning and polishing boots and shoes in a simple and compact form.

Patented through the Scientific American Patent Agency, Nov. 12, 1867, by Charles A. Paret, of 43 Union street, Nashville, Tenn. The patentee desires to dispose of the entire right, or to make arrangements for manufacturing on a royalty. Those interested will address as above.

YANKEE SAFETY POCKET.

The art of the pickpocket is successful not only because of the dexterity of its practitioners, but also because the preventives used are not usually effectual. A pocket, to be se-



cure against the depredations of the light fingered, should not only be locked, but composed of such material as cannot be readily cut. Such are the characteristics of that shown in the accompanying engraving, which represents it as attached to the inside of a vest. The outside of the pocket is

of leather, similarly lined, having between the two a network of steel, impenetrable by the knife of the operator. The top is a clasp resembling those used on porte monnaies, with the difference that the knob, by pressing which it is opened, is movable, the piston or stem being a screw on which the button turns; when down on the face of the jaws it cannot be depressed to operate the spring catch, while a few turns will raise it on the spindle or stem so that the pocket may be opened. A series of metallic eyelets around the edge of the pocket afford a ready means of attaching it to the garment, whether vest, coat, pants, or a lady's dress.

This device was patented Oct. 24, 1865, by T. S. Lamborn, who desires to dispose of territorial rights, and may be addressed at Marshallton, Pa. [See advertisement on another page.]

New Locomotive for Common Roads.

Mr. R. W. Thomson, C. E., Edinburgh, has invented and patented a new locomotive for common roads, which was lately tried in the neighborhood of Edinburgh.

The tires are made of bands of vulcanized india-rubber, about twelve inches wide and five inches thick. Incredible as it may appear, this soft and elastic substance not only carries the great weight of the road steamer without injury, but it passes over newly broken road metal, broken flints, and all kinds of sharp things without leaving even a mark on the india-rubber. The tires do not sink into the road in the least degree. They pass over stones lying on the surface without crushing them.

The india-rubber tires require scarcely any more power to propel them over soft bad roads or over loose gravel roads than on the best paved streets. The reason of this is quite obvious; they do not sink into roads, and do not grind down the stones in the least degree.

On Monday, the trials commenced by running the road steamer across a soft grass field, and it was afterward taken across a part of the field which had just been covered with loose earth to the depth of one or two feet, and run straight across, and then back through the deep soft soil. The weight of the road steamer is between four and five tons; and yet the wheels, in passing over the loose earth, compressed it so little that a walking-stick could easily be pushed down in the track of the wheels without any exertion. After various evolutions, showing the ability of the road steamer to run about where there were no roads, it passed out into the street, and, taking a large omnibus full of passengers in tow, it proceeded up the Bonnington road to Messrs. Gibson and Walker's mills, where it took a large wagon, weighing, with its load of flour, about ten tons, up a steep lane full of holes and ruts, and rising with a gradient of one in twenty. It was obvious that the road steamer was able to do a great deal more than it had to do in this trial. The bite on the road is something marvellous, and the easy way in which it floated along on its soft and elastic tires was very curious. When riding on the road steamer, the feeling is like what would be experienced in driving over a smooth soft grass lawn. There is, absolutely, no jarring at all. There was no appearance of wear on the india-rubber tires. The original surface which the rubber had when it left the manufactory is still visible. The engine is destined for Java, where it will be employed in drawing trains of wagons between two ports. The steamer, which was the subject of the experiments, had another specialty besides the wheels, it being fitted with one of Mr. Thomson's patent vertical boilers.—*Engineering.*

Experiment on the Formation of Aniline Colors.

Pour into an ordinary test tube one fluid dram of pure concentrated sulphuric acid and add to the same one-tenth to three-tenths fluid dram of a diluted solution of sulphate of aniline. When, now, the solutions of different oxydizing agents, as those of chlorate or nitrate of potassa, hypochlorite of soda, chromic acid, bichromate of potassa, iodic acid, peroxide of hydrogen, or others, are allowed to flow upon the mixture of the tube, a characteristic coloration ensues at the place where the two fluids come in contact, in shaking the same is communicated to the whole liquid. Hypochloric acid or its respective salts produce a beautiful blue, nitric acid or its salts a rich carmoisin, chromic acid a bright violet. The nuances vary according to the strength of the liquids, and as there are but traces sufficient to produce a certain color, reactions may be founded upon them for the recognition of said oxydizing agents.

Preservation of Photographs.

H. Cooper, Jr., of England, gives the following formula for a preservative varnish which is stated to be an entire protection against fading:—

1 dram of gum dammar dissolved in one ounce of benzole.
1 dram of paraffin, dissolved in one ounce of benzole.
Mix four parts of the paraffin solution with one part of the dammar solution.

Prints covered with this varnish are impermeable to water. A solution of the paraffin only will do; but is better with the gum dammar.

THE ARAB JUGGLERS.—Mr. Frank Buckland gives in *Land and Water* the result of his observations of these performers. The snakes they handle are not poisonous, but belong to a harmless species common in France and England. The man who thrusts skewers through his tongue and the back of his neck, has permanent holes for their introduction, and does not suffer more pain than when a lady puts on her earrings after leaving them off for some time. Other features of the exhibition remain unexplained. Mr. Buckland concludes: "Altogether, I do not recollect having seen an exhibition which combines so many horrible and truly sensational sights in so short a space of time."

Scientific American.

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Messrs. Trubner & Co., 66 Paternoster Row London, are also Agents for the SCIENTIFIC AMERICAN.

VOL. XVIII., No. 1...[NEW SERIES.]...Twenty-third Year.

NEW YORK, SATURDAY, JANUARY 4, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

| | | | |
|---|---|---|----|
| *Improvement in Setting Blocks for Saw Mills..... | 1 | The Dignity of Labor..... | 5 |
| *Important Patent Suit..... | 1 | Editorial Summary..... | 5 |
| *Barley's Case Stripping and Fraying Knife Combined..... | 1 | Manufacturing, Mining, and Railroad Items..... | 6 |
| Passenger Travel on British Railways..... | 1 | Recent American and Foreign Patents..... | 6 |
| On Snow, Rain, and Hail in their Relations to the Atmosphere..... | 2 | New Publications..... | 7 |
| The Hoosac Tunnel Drills..... | 2 | Answers to Correspondents..... | 7 |
| Replies to Questions on the Day Line..... | 2 | Extension Notices..... | 7 |
| Heat Without Coal—Utilization of Wind Power..... | 2 | Boiler Explosions—What Can Be Done to Prevent Them..... | 8 |
| The Cold Cave at Decatur..... | 2 | *Pare's Improved Blacking Brush..... | 8 |
| *Solution of Plane Triangles..... | 2 | *Yankee Safety Pocket..... | 8 |
| Removal of Obstructions in the Mississippi at Rock Island..... | 2 | New Locomotive for Common Roads..... | 8 |
| Moment and Inertia..... | 2 | Experiment on the Formation of Aniline Colors..... | 8 |
| Aluminum for Mathematical Instruments—Folding Machine..... | 2 | Preservation of Photographs..... | 8 |
| Extinction of Cockroaches..... | 2 | Encouraging Prospects..... | 9 |
| Naphthalin and its Use..... | 2 | Stereotyping with Paper..... | 9 |
| On the Formation of the Diamond..... | 2 | Mining Education—Governmental Mining Schools..... | 9 |
| A Daring Explorer..... | 2 | *Our Iron Deposits..... | 9 |
| *Skating Rink..... | 2 | Illuminated Time Calendar for 1868..... | 9 |
| | | Patent Claims..... | 10 |
| | | Pending Applications for Reissues..... | 14 |

ENCOURAGING PROSPECTS.

In our last issue we stated that it was our desire to increase the circulation of the SCIENTIFIC AMERICAN from thirty-five thousand to fifty thousand on the new volume. We are encouraged from the prompt manner in which our old patrons are renewing their subscriptions, and the large clubs of new names our good friends are sending in, that our ambition to increase the weekly circulation to fifty thousand will be early accomplished.

STEREOTYPING WITH PAPER.

This is now in common use in all the principal daily newspaper establishments in New York. It is conducted substantially as follows: The stereotyper first dries the form of types upon an iron steam table. The form is then partially unlocked and a hand brush is rubbed over the surface of the types, cleansing them preparatory to placing over the entire form a sheet or sheets of thin bank note paper, of the finest quality, previously wetted to insure the required pliability. This paper being evenly laid over the types, the workman takes a long-handled brush made of short, stiff bristles, with which he beats the wet paper evenly, forcing it into all the depressions of the types, taking care not to break the paper. This work finished, a dampened sheet of thicker but more ordinary paper is placed over the first. This is also brush-hammered down upon the types, and followed by another sheet of paper, thinly coated with a preparation of whitening and starch. Again the brush is used to beat this home, after which a brown paper backing is put on, and then the form of types, covered by the before-mentioned sheets of paper, is trundled to another steam table, where it is slid under a powerful screw press, several blankets folded over it, and all firmly held down until the paper matrix is dry-hardened, or "cooked," as the workmen express it. The papering process occupies three or four minutes, the cooking about twice as many. The matrix is now peeled off from the form and prepared for casting, by sifting it with finely powdered borax, which with a soft brush is thoroughly rubbed into the sunken surface left by the types. The surplus borax having been removed, the matrix (which now resembles hard but pliable pasteboard) is ready for the casting box, which is made of iron, either straight or curved, to suit the press bed. Handle irons hold the matrix in its proper place, at the exact distance (about half an inch) necessary for the thickness of the stereotype plate, which is made by pouring a quantity of hot type metal into an open end of the casting box. This metal, dropping between one surface of the casting box and the sunken surface of the matrix, fills up the latter without burning it. A few moments are allowed for cooling, and then the matrix is stripped from the warm plate, which is subsequently prepared for the press, by trimming down all thick lines, or chiseling away any superfluous metal, paring off the edges, filing, and otherwise treating the stereotype after the usual manner. Circular saws driven by steam power, and hand cutting machinery of various kinds are used in finishing, the whole operation of stereotyping occupying from fifteen to twenty minutes. A second plate may be obtained from the original matrix, in about two minutes, and almost any number of castings can be taken by careful workmen. In some offices only one mold is taken, this being used for casting the number of plates required for several presses. The stereotype, being an exact reproduction, in solid plate form, of the million or more types originally put together by the compositors, is fastened upon the Hoe, Bullock, or any other printing press, and used in place of the types. The advantage of duplicating the plates is apparent. Two or ten

presses, working similar plates, will print off in a couple of hours an edition of twenty or a hundred thousand copies, which formerly occupied so much more time that when ten or twelve-cylinder "fast" presses became "slow," second and third editions were resorted to by editors desirous of giving the public the latest news. Previous to the use of stereotypes for newspaper purposes, duplicate forms were sometimes "set up" in type, an extra expense to the office adopting this course which was incurred only whenever a pressure of important news was likely to prevent the forms going to a single press in season for working off the edition. Compositors can now work until three and four o'clock in the morning, and half an hour later half a dozen "duplicates" of their work may be seen on as many different presses, striking off the printed sheets, units of an immense edition of perhaps seventy-five or eighty thousand copies of some newspaper, all of which are frequently counted and delivered to the carriers and newsmen before the editors, compositors, or stereotypers can reach their homes and retire to rest.

MINING EDUCATION—GOVERNMENTAL MINING SCHOOLS.

No department of industry in this country has received such an impetus, or been so largely developed within the past twenty years, as the mining of metals. Especially is this statement applicable to the production of the precious metals. Their mining and separation has become one of the most important departments of our national industry. From this source more than from any other, perhaps, is derived the bullion upon which the government relies to redeem its promises. Yet, with all the developments of new mines, the increase of the number of men engaged in the business, and the improvements made in reducing machinery and appliances, it is believed that the amount of the precious metals derived are wholly inadequate to the means, whether of labor, capital, or material, employed. Not only so, but the actual production is gradually declining. Surface workings, however rich, and however easily made profitable, are soon exhausted, and then the labor of human hands must be superseded by the power of machinery and the agency of chemical science.

And it is in these respects that the failure to increase the total yield of our gold and silver fields is most perceptible. It is confidently asserted that our imperfect systems of reduction entail a loss of at least twenty-five per cent, probably more. On the Comstock lode, a return of sixty-five per cent of the silver contained in the ore is considered very fair. The yield of this lode for the past year is estimated at \$17,000,000. A loss of thirty-five per cent amounts to more than \$9,000,000.

We have received several communications on this subject, from practical men acquainted with the facts, all of whom attribute this waste entirely to a lack of scientific knowledge of the quality of the ores, the best methods and materials for their reduction, and to the want of proper machinery. To remedy this undesirable state of affairs, practical education is necessary, and the establishment of governmental schools for instruction in the treatment of ores is advocated. At present our skilled managers are mostly foreigners; those Americans who are engaged in mining, and possess a scientific knowledge of the business, having gained it in foreign schools. Mr. J. Ross Browne, in a pamphlet just received, proposes the establishment of a national school, for practical and scientific instruction in the reduction of ores, at some convenient locality in our gold and silver producing regions. That such a school, properly managed, is to be desired by every consideration of national advantage cannot be denied; but we cannot see the necessity of its being established or supported by the national government, any further than an appropriation of money or lands could be considered as an aid. Instruction in the science of the mining art is already adopted as a branch of study by several of our educational institutions. Yale, Harvard, Columbia, and other colleges have departments devoted to this branch, and others will undoubtedly follow their example. Neither do we see the necessity of locating such an institution as that proposed in a mining region. Assays of ores and their chemical treatment can as well be made and accomplished in New York city, or anywhere else, as in Colorado, California, Montana, or Arizona, and certainly the locations should be chosen with a view to the benefit of the greatest number. Governmental patronage and interference in our industrial pursuits seldom have produced satisfactory results. An endowment by government may be very well, but the institution should be managed by the associated effort of those directly interested.

A correspondent from Denver, Colorado, advocates similar schools, to be established and conducted by the legislatures of the states or territories. A bill for a school, he informs us, has been passed by the legislature of Colorado. This writer believes the institution will be self-sustaining from the income of donated property, tuition fees, the labor of students, assaying, ores presented for analysis, the proceeds of its own mines kept continually at work, and the preparation of plans, etc., for the construction of works. We confess we do not share in the sanguineness of our correspondent's belief. He expects the school to be in some respects an incorporated company, owning, controlling, and working its own mines. Such an institution, under the patronage and direction of a state legislature, would become, in all probability, a source of corruption, and its objects removed from the domain of science to the arena of politics. We see no more reason for establishing governmental schools for teaching mining than for teaching farming.

Doubtless, however, the facilities for procuring a thorough scientific and practical knowledge of the metals and their reduction from their ores should be increased, and that, we

think, can be done without placing such institutions under the control of the government or locating them exclusively in mining regions. The remedy for the want of truly scientific knowledge on this subject is to be found in the exertions of individuals and companies directly interested in mining, rather than in appeals to the government either of a state or the nation.

Our Iron Deposits.

Iron ores of nearly every species and variety are distributed profusely over the whole country, and among them are species which belong to North America alone. Native iron—has only been met with in Canaan, Conn., in a vein or plate of two inches thickness, and is rather a mere curiosity. The ore, however, most generally distributed over the country is that of the mineralogical term limonite; it comprises a great number of varieties of all shades of color and the most varying forms, as the brown and yellow hematite, the pipe and bog ores. They are nearly all very well qualified for the manufacture of pig metal, and contain in their pure condition 59.15 lbs. of iron in 100 lbs. of ore. Vast beds of this ore are near Salisbury and Kent in Connecticut. Similar deposits are in the State of New York; it occurs in Massachusetts, Vermont, Maryland, and Ohio. The whole iron business of Hanging Rock depends upon it. Kentucky, Tennessee, and Alabama abound in inexhaustible beds of the best quality, but Pennsylvania is favored with the richest varieties of this mineral. It is there found in the anthracite region and in the valleys of the western coal formation. The kind of ore particularly adapted for the production of heavy wrought iron, yielding a most tenacious metal, is the red iron ore. If pure, it may contain about 70 per cent of iron, but when associated with clay, or silicious matter, it often does not yield more than 10 to 12 per cent of it. Specular iron and iron glance are varieties of this ore, the former being the kind from which the damask of Persia and the woots of India are manufactured. In the United States it is, however, not yet found in any amount worth noticing, but other varieties are found throughout the Union. Heavy beds of the red variety occur in Wisconsin and Michigan; other but inferior varieties are largely met with in Missouri, New York, New Jersey, Pennsylvania and Arkansas.

MAGNETIC IRON ORE, LOADSTONE.—The richest kinds of this ore, as that occurring on the west side of Lake Champlain, contain 70 per cent of metallic iron; other varieties—conglomerates—do not yield more than 20 to 25 per cent, of the metal. Large and valuable beds of magnetic iron are found in Essex county, New Jersey, Pennsylvania, New York, and Ohio. The iron mountains of Missouri also appear to belong to this species. It forms the main body of iron ore in Sweden.

THE CARBONATE OF IRON.—This species comprises two varieties: the spathic, or sparry iron, and the compact carbonate, which has no relation externally with the sparry variety. The compact carbonate is largely distributed over the United States; its finest quality is found near Baltimore. We also find it in the Fostburg coal region, in Maryland, and in almost all the western coal deposits along the Alleghany and Ohio rivers. It generally does not contain more than 20 to 33 per cent of metallic ore, but is little used, on account of its being of rather difficult treatment in preparing it for smelting. The same is the case with the sparry or spathic variety, which almost in all instances, where it occurs, is adulterated with sulphur, and in some cases with copper. Large quantities of this ore are found in Vermont, Connecticut, and New York; smaller veins occur in all the New England States, in New Jersey, Pennsylvania, Virginia, North Carolina, and the States around the Lakes. In North Carolina it forms the bulk of a vein of gold ore, and it besides this associates with nearly all kinds of metallic ores, changing the character of a vein from one kind of an ore to another.

The Franklinite or dodecahedral iron ore is composed of 66.00 parts of peroxide of iron, 16.00 parts of oxide of manganese, and 17.00 parts of zinc, being a species which belongs to North America alone. It is, in association with the red zinc ore, found in large veins and masses near Franklin furnace, in Hamburg, N. J., and at Sterling, in the same vicinity, and is a most important ore, particularly for the manufacture of crushers and mills. The mixed ore of Franklinite and red zinc has been successfully worked for metallic zinc.

Illuminated Time Calendar for 1868.

Subscribers to the SCIENTIFIC AMERICAN who would like a copy of our handsomely illuminated Calendar for 1868, can have copies mailed to them free on sending their address to this office.

PROPOSED OVERLAND ROUTE THROUGH BRITISH AMERICA.—Mr. Waddington, a person of note in British Columbia, has sailed for England to advocate a pet scheme of his which is the construction of a railroad through British America connecting the Atlantic and Pacific oceans. The journey across this part of the continent has been undertaken by only few adventurers, and to this day a package of merchandise or mail bag has never passed direct from Canada to British Columbia. From a pamphlet Mr. Waddington has published it appears that by making use of the lakes and rivers on the line 2,400 miles of steam navigation can be introduced. The railroads now in running order at the East are 1,285 miles more making necessary only the building of 648 miles of road more. When the line is completed the time to be occupied in traversing the entire 4,333 miles from ocean to ocean will not exceed twenty to twenty-three days.

ADVERTISERS are referred to the new rates for advertising as announced in the first column of advertising page.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING DECEMBER 17, 1867.

Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees—

| | |
|---|------|
| On filing each caveat..... | \$10 |
| On filing each application for a Patent, except for a design..... | \$15 |
| On issuing each original Patent..... | \$20 |
| On appeal to Commissioner of Patents..... | \$20 |
| On application for Extension of Patent..... | \$20 |
| On granting the Extension..... | \$20 |
| On filing a Disclaimer..... | \$10 |
| On filing application for Design (three and a half years)..... | \$10 |
| On filing application for Design (seven years)..... | \$15 |
| On filing application for Design (fourteen years)..... | \$20 |

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay \$500 on application.

Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.

72,152.—BOLT MAKING MACHINE.—Abram Alexander, Pittsburg, Pa.

I claim the combination of the piece, D, guides, d d, and frame, A, with the pieces, H, H', bolts, G, G', and gripping dies, J, J', guides, G' G' G', arranged and operating substantially in the manner and for the purpose set forth.

The compound cam, F, and block, F', in combination with the drop piece, D, to obtain a vertical upward motion of said piece, D, in the manner specified and for the purpose set forth.

The hollow screw, bolt, S, and nut, N, in combination with the hammer, T, or its equivalent, and the gripping dies of a bolt making machine, substantially in the manner and for the purpose set forth.

72,153.—MACHINE FOR MAKING BOLTS.—Abram Alexander, Pittsburg, Pa.

I claim the combination and arrangement of the cam, C, levers, G and M, bar, D, and pin, T, with the weight, W, or a spring, acting substantially in the same manner when used and applied to operate the gripping dies closing machinery described in my improved bolt making machine, or any other substantially the same.

72,154.—CHURN DASH.—Andrew E. Banks, Detroit, Mich.

I claim, 1st, The use of the bowl pins, B B B, for the purpose described, when arranged substantially as set forth.

2d, The combination of the disks A, etc., with holes through them, F, F', etc., the upper disk or collar, G, with the hollow handle, C, provided with the valve, E, and the bowl pins, B, etc., when arranged substantially as described and for the purpose set forth.

72,155.—SAW MILL.—Ashbel P. Barlow, Claremont, N. H.

I claim, 1st, The ways or guides, b, constructed with the double inclines and parallel sides, substantially as shown and described.

2d, The cross head, cut away as shown at a, and provided with the lips having the convex faces, r, r', constructed and operating substantially as and for the purpose set forth.

3d, The saw buckle perforated and slotted as described, in combination with the gib or key bolts, o, as set forth.

4th, The hollow pitman, slotted at m, and provided with adjusting keys for varying the distance of the saw pivot from the pitman fulcrum, in the manner and for the purpose set forth.

72,156.—DEVICE FOR ACCUMULATING POWER.—George H. Becker, (assignor to himself and John C. Lanier), Memphis, Tenn.

I claim the construction and combination of the levers, E G J M O R A, with the pitman, D H L P and U, the connecting arm, T, and the wheel, W, and weight, T, when arranged as herein described and for the purpose set forth.

72,157.—DRYING AND SEASONING LUMBER.—E. C. Bender, York, and Wm. Steffe, Philadelphia, Pa.

We claim the within described process of seasoning lumber, consisting in subjecting the lumber to the action of a gradually increased temperature, in an air tight chamber, until all or nearly all the moisture has been extracted from it; in retaining all the heat and watery vapor about the lumber until a temperature of about 170° Fah. has been attained in said air-tight chamber; and, finally, in compelling the heated moistened air to escape slowly from said chamber, while the temperature is reduced therein substantially in the manner herein specified.

72,158.—PRESERVING EGGS AND OTHER SUBSTANCES.—Chas. Bolles, New York City, assignor to himself and Peter M. Devos.

I claim the use of argillite, substantially as and for the purpose described.

72,159.—PLUMB AND LEVEL.—S. A. Bostwick, Laconia, N. H.

I claim the semicircular spirit level, B, fitting and adjusting in the semicircular space in the stock, A, arranged and operating substantially as and for the purpose herein specified.

72,160.—SHOVEL AND SIFTER.—D. Boynton, St. Johnsbury, Vt., assignor to himself, H. G. O. Burrows, and Arthur E. Whitney.

I claim a shoveler, A, provided with a supplemental bottom, c, containing a screen, f, and also provided with a cover or lid, B, all arranged in the manner substantially as and for the purpose set forth.

72,161.—MACHINE FOR SEPARATING ROOTS FROM PLANT.—Seawall Brackett, Jamaica Plain, Mass.

I claim the combination and arrangement of the carriage, B, the main and supplementary grates, D, G, the series of pins, c, mechanism for raising the supplementary grate on the pins and mechanism for imparting to the main and supplementary grates reciprocating longitudinal movement as set forth, these mechanisms being the lever, I, the bar, H, and the uprights, f, and the crank shaft, E, and connecting rod, F.

72,162.—MANUFACTURE OF STEEL.—James R. Bradley and Moses D. Brown, Chicago, Ill.

We claim the improved process for making steel of different kinds herein described, by mixing the several ingredients in the proportions, and melting the same with malleable or scrap iron, as specified.

72,163.—HARVESTER RAKE.—Isaac P. Cadman (assignor to himself and James Aiken), Mendota, Ill.

I claim so combining a circular reciprocating rake with the cam wheel which gives it its rising and falling motion as that the rake shall move said wheel when it clears the platform, and without it when it returns for the next sweeping or clearing operation, substantially as described.

72,164.—DEVICE FOR ATTACHING OVERBOOTS TO BOOTS AND SHOES.—B. H. Camp, Washington, D. C., assignor to himself and Rufus Prentice.

I claim in combination with the oversole, a, the corrugated elastic clasp, b, when constructed, arranged and operating in the manner herein described.

72,165.—HYDRAULIC ELEVATOR.—Thomas Chambers, St. Louis, Mo.

I claim, 1st, The reservoir, A, the car, B, the chamber, R, the pump, D, and the pipes, D, I and D', when combined and arranged as described and set forth.

2d, The indicator, c, e, f, e, c, d, when arranged in relation to the dumb waiter as described.

3d, The brake attachment, L, L', when constructed and arranged in relation to the elevator as described and set forth.

4th, The self-closing and unloading shaft, b, when combined with the elevator car, as described and set forth.

72,166.—PADLOCK.—Charles J. Clements, New York City.

I claim the guard plate, B, arranged and operating in combination with the tumblers, a, substantially as and for the purpose herein specified.

72,167.—MECHANISM FOR CONNECTING A HORSE WITH A CARRIAGE.—Alvin Colburn, Lynn, and Elbridge G. Stanley, Fitchburg, Mass., assignors to Alvin Colburn and John Radwin, Lynn, Mass.

We claim the arrangement of the connecting bar-case, B, with its bar, C, and spring attached the side instead of on the end of the shaft, the same rendering no reduction of the shaft necessary in the application of the invention thereto.

Also the combination and arrangement of the spring bolt with the socket piece and the bar, C, its case and spring, arranged with the shaft as set forth.

Also the combination of the double eye piece, F', having a tooth, as described, with its spring bolt, its case and socket piece, to be used with the slide bar, C, made and applied, or to be applied to a shaft substantially as described.

72,168.—LUBRICATING CUP.—J. B. Collin (assignor to himself and R. E. Ricker), Alhons, Pa.

I claim an oil cup having an adjustable tapering pin projecting through, but free from contact with the sides of an orifice communicating with and smaller than the discharge passage, x, so as to form a regulating drip or guide for conveying the oil from the cap to the said passage, all substantially as described.

72,169.—WATER WHEEL.—Gilbert M. Conner, Cohoes, N. Y.

I claim, 1st, The combination of the circular receiving chamber and the helical floor, or its equivalent, with the radial guide vanes, substantially as described.

2d, The combination of the central hub, and its inclined and twisted buckets, with the conical wheel case, all constructed and operating substantially as described.

3d, The combination of the deflecting floats with the controlling rim, for the purpose specified, arranged and operating substantially as described.

72,170.—BOAT LOWERING APPARATUS.—Robert Creuzbaur, New York City.

I claim, 1st, Davits which are hinged in such manner as to swing freely in vertical or nearly vertical planes toward and from the water, and to vibrate above and below a horizontal plane intersecting their axes of motion, substantially as described.

2d, The application of curved sections to the upper ends of davits which are hinged at their lower ends, so that said sections can be turned around in-

dependently of the standards or lower sections of the davits, substantially as described.

3d, The application of a ladder to a davit, operating substantially as described.

4th, The combination of a folding hand rail and ladder to a hinged davit, operating substantially as described.

5th, Boats' davits hinged substantially as described, when counterpoised by a force sufficient to raise them without the boat, but easily overcome by the weight of the boat.

72,171.—BOAT LOWERING APPARATUS.—Robert Creuzbaur, New York City.

I claim, 1st, The application of elastic cushions, v, v', between the hand-wheel hub, Q, and the ratchet wheel, U, for the purpose and in the manner substantially as described.

2d, The longitudinally traveling drums, K, applied to the shaft, L, substantially in the manner and for the purpose described.

3d, In combination with the pivoted ships' davits, the pivoted shield or guard, S, constructed so as to keep the ropes, R, in place upon their pulleys during the raising and lowering of a boat, substantially as described.

4th, The combination of elastic pressure roller, M, with the roller or pulley, b, for preventing the slack of rope, B, from extending back to its drum, K, substantially as described.

72,172.—BOAT DETACHING APPARATUS.—Robert Creuzbaur, New York City.

I claim, 1st, Spring bolts, d d, or their equivalents, constructed as described, and applied to sheaths, so as to catch and hold the suspension tongues, c c, when thrust into said sheath, substantially as described.

2d, The employment of eccentrics or cams, b b, in combination with the rods, c c, and spring bolts, d d, substantially as described.

3d, The feathered coupling tongues, C, in combination with grooved and spring sheaths, substantially as described.

4th, The attachment of the coupling tongues to springs or spring boxes, substantially as described.

72,173.—CORN POPPER.—Daniel A. Denison, Troy, Mich.

I claim the arrangement and combination of the wire cloth pan, A, with the pieces of strap iron, B, B, and the tin pan or cover, D, all arranged substantially as described and for the purpose set forth.

72,174.—STICK FOR TRUNDLING HOOPS.—Agnes Doisy, Cincinnati, Ohio.

I claim the improved hoop stick, B, provided with an elastic strap, tape, or cord, D, fastened by one end to the stick, B, and being susceptible of being hooked, or fastened by the other end to the said stick, in the manner and for the purpose set forth.

72,175.—WASHING MACHINE.—H. C. Dorman, North Bridge-water, Mass.

I claim, 1st, The combination and arrangement of the wheels, W, W', the tub, S, the knob, K, with the springs, H, H', substantially as described and for the purpose set forth.

2d, The holding disk, T, when slotted at V V', in combination with the reciprocating tub, S, substantially as described and for the purpose set forth.

3d, The fire-proof safe, E, in combination with the case, A, and the fusible metal sealing or solder, c, of the kind described, such cap being arranged with the box, D, substantially as described.

72,177.—DEVICE FOR SECURING AND FEEDING SOFT CRABS.—Constantin Drexler, Washington, D. C.

I claim a marine inclosure constructed and arranged as shown, and provided with the guards or fenders, f, and the movable floats, g g h, or their equivalents, forming artificial hiding places, arranged as shown and for the purpose substantially as described.

72,178.—ROCKER FOR CHAIR OR CRADLE.—Chas. S. Dunback, Swampscott, Mass.

I claim the arrangement of the guard or cushion, B, against or about the end of the rocker, in manner and for the purpose specified, meaning also to claim as an improved manufacture, a rocker as made with an elastic cushion applied to its rear end as described.

72,179.—STOVE BACK PLATE.—Giles F. Filley, St. Louis, Mo.

I claim the method of forming the draught flue projection in the back plate of stoves with a curvature, in the manner substantially as shown and specified.

72,180.—SEWING MACHINE.—William Fiske, Lowell, Mass.

I claim, 1st, The combination of a sewing machine with a movable table, by means of cord, H, and pulley, I, and shaft, F, worm and worm gears on the shafts, G, G', and cord, J, with shaft, C, substantially as herein set forth and described.

2d, The band, P, on pulleys, R and Q, with tightener, Q, R, for transmitting power from shaft, E, to shaft, O, substantially as set forth and for the purpose described.

3d, The combination of M, tightener, N, belt, D, shaft, E, F, and cord, H, for the purpose herein set forth.

4th, Also the brake, S, on shifter, M, in connection with detent, T, and balance wheel, U, as fully set forth and for the purposes described.

72,181.—MACHINE BELTING.—Vincent Fountain, Jr., Castle-ton, N. Y.

I claim forming machine belting by combining leather with metal riveted sheets, as herein described.

72,182.—ORE CONCENTRATOR AND AMALGAMATOR.—Stephen Fountain, Silver City, Nevada.

I claim the box, D, having the valve, b, stems, n, or an equivalent device, together with their operating levers, d, and the rods, g, the whole constructed and arranged substantially as and for the purposes herein described.

72,183.—DRIVEN WELLS.—Oscar C. Fox, Georgetown, D. C.

I claim a well tube constructed wholly of woven wire of different textures, shown as being arranged with a drill point, having a drip through its body, all substantially as and for the purposes described.

72,184.—PORTABLE SWITCH.—B. C. Galvin, New York City.

I claim, 1st, The single switch, constructed and arranged as described, with bar, D, plate, E, teeth, F, clip of the rail, A, rail plate, G, wheel guide, C, and leveling link and casting, L, L, and vertical acting hinge, H, in bar, D, as and for the purpose set forth.

2d, The double portable switch, when constructed with vertically hinged arms, A, attached to plate, O, with frog, F, and movable arm, S, working in notches, B, with movable and sliding side lugs, L, L, and parts, B, and W, all constructed and combined as and for the purpose set forth.

3d, Also, the car replacer or switch above described, the three inclines, combined and constructed substantially as described, and for the purpose set forth.

72,185.—RAILWAY SWITCH.—B. C. Galvin, New York City.

I claim, 1st, In railroad switches, as shown in sheet No. 1, figure 1, the construction and arrangement of fixed and movable rails with curved extremities, the movable rails and extremities being hinged to the fixed rails, and the movable rails locking therein by the straight insertion self-locking rail end joint shown in figs. 2, 3 and 4, and by the dovetail joint in the ends of said rails, fixed and movable, all substantially as described for the purpose set forth.

2d, In railroad switches as shown in sheet No. 2, fig. 5, the construction and arrangement of fixed rails connected by curved extremities, and straight track-crossers, made with hollow ends, all substantially as described, for the purpose set forth.

72,186.—TWINE HOLDER AND CUTTER.—Thomas Garrick, Providence, R. I.

I claim the combination of a cutting blade with a spiral convoluted shield, constructed substantially as and for the purpose specified.

Also, the spring clamp, in combination with the metallic shell for holding the blade of the twine holder, as specified.

72,187.—ARGAND BURNER.—Elliott P. Gleason, N. Y. City.

I claim, 1st, In argand burners, the regulating screw, for the purposes fully indicated.

2d, In combination with the same, the lever, for the purposes fully indicated.

72,188.—BURNER FOR HEATING GAS, ETC.—Elliott P. Gleason, New York City.

I claim the employment of the tube, C, within the tube, A, in combination with the burner, B, when the same shall be combined, constructed and operated substantially as shown, for the purposes set forth.

72,189.—PRESSURE SAFETY VALVE.—Henry A. Goll, Chicago, Ill.

I claim, 1st, The combination of valves, O, N and H, with cylinder, G, and piston, F, substantially as set forth.

2d, The valve, H, arranged to operate in cylinder, G, and having a shoulder on the top of it corresponding with the diameter of the valve seat, T, in combination with said cylinder pipes, F, and valves, O, N, substantially as herein described.

3d, The combination of cock, C, pipe, E, double valve, O, N, and cylinder, B, as and for the purpose set forth.

4th, The valve, O, having the opening, d, in its stem, for the escape of steam above said valve, in combination with a lower valve, N, arranged to receive pressure directly from boiler, A, as set forth.

72,190.—LETTER BOX.—Charles P. Gorley, Boston, Mass.

I claim, 1st, The combination of the lid, B, and springs, d d', in the manner and for the purpose described.

2d, The combination of the lid, B, springs, d d', catch, e, and lever, E, in the manner and for the purpose specified.

72,191.—NAPHTHA BURNER.—L. A. Gouch, Yonkers, N. Y.

I claim the detachable conductor, in combination with a burner constructed and operating substantially as described.

72,192.—STEAM SAFETY VALVE.—Virgil D. Green (assignor to himself and E. M. Hall), Watertown, Wis.

I claim the cylinder, A, the drum, B, the spring, G, the ratchet and pawl, D, in combination with the cam, m, and the chain, H, substantially as described and for the purpose set forth.

72,193.—MEDICAL COMPOUND.—John Greenwald, Cincinnati, Ohio.

I claim the compound as specified, for the purposes set forth.

72,194.—REEL OVENS FOR BAKERS.—Emily S. Greffet, St. Louis, Mo., administratrix of the estate of Joseph A. Greffet, deceased.

I claim, 1st, The combination of a drum with the revolving pans of an oven, when constructed and arranged substantially as shown and specified.

2d, The arrangement of the regulating flues, p p' p' p' of an oven, with their respective dampers and operating rods, when constructed and arranged substantially as shown and specified.

72,195.—BAIL FOR KETTLES.—Wm. Halles, Albany, N. Y.

I claim constructing the metal sections, B, with sockets formed within the enlargements, b b, of said sections, such sockets having the ends of a wooden handle fitted into them, and such handle being held in said sockets by a rod, e, which passes through the handle and through the enlargements, b b, and is fastened to the latter, all substantially in the manner shown and described.

72,196.—LOCK FASTENER FOR LAMP.—John Harding, War-ington, Lock, Great Britain.

I claim the application, employment, and use of a soft metal or other rivet,

or other compressible plug, as a fastener for safety lamps, instead of locks, screws, or other mechanical contrivances now employed.

72,197.—MACHINE FOR CUTTING OUT GLOVES.—Jesse H. Harlan and Thomas Pomeroy, Denver City, Col., assignors to themselves and Wm. H. Harlan.

We claim the adjustable knives of a glove cutter, when constructed and arranged substantially as shown and specified.

72,198.—HARVESTER RAKE.—H. A. M. Harris, Philadelphia, Pa.

I claim, 1st, The combination as described of the rake arm with the guide, F', both rotating on a common axis.

2d, The combination, substantially as described, of the heater arms, revolving in a fixed relation to a common axis, with the rake having a rotating, A, circumferential, and an axial movement around said axis.

3d, The combination, substantially as described, of a stationary collar, to support the raking mechanism, a tubular axle, revolving within said collar, and carrying rake and reel arms, and counterbalance rock shaft, turning axially within said axle, to regulate the movement of the rake.

72,199.—HARVESTER RAKE.—H. A. M. Harris, Philadelphia, Pa.

I claim, 1st, The combination, substantially as described, of a rake rotating on a tubular axle, with a cast shaft, link and counterbalance, to hold the rake down when raking off, to lift it quickly at the end of its backward movement, and to draw it inward when passing forward.

2d, The combination, substantially in the manner described, of a continuously revolving rake, with a counterbalance, and latching and unlatching device.

3d, The combination, substantially as described, of a continuously revolving rake—having a pivot movement in its support—with a cam and compound lever, for the purposes both of turning the rake axially and of holding it in a line radial with its axle while raking off, as set forth.

72,200.—CAR COUPLING.—A. Hillman, Devonshire, England, assignor to Thomas R. Fuller, Samuel Fuller, and James S. McMurray.

I claim, 1st, The coupling boxes, D, constructed as described, and secured to the draught bar or bars, C, by the flange di, and braces, E, substantially as and for the purpose herein set forth.

2d, The coupling link, K, constructed as herein shown and described, and the coupling box, D, having perforations for the reception of the pins, k', of the link, K, substantially as and for the purpose herein set forth.

3d, The combination of the slotted, wedge-shaped, adjusting block, L, with the coupling link, K, substantially as herein shown and described, and for the purpose set forth.

4th, The combination and arrangement of the coupling box, D, spring, J, pivoted coupling bar, G, uncoupling rod, H, and lever handles, I, with each other and with the draught bar, C, substantially as herein shown and described, and for the purpose set forth.

72,201.—FURNACE FOR SMELTING PRECIOUS METALS.—H. Gengenbrenner, New York City.

I claim, 1st, The combination of the boxes, D D' D'' D''' etc., the pistons, E E' E'', etc., and screws, f' f', etc., or their equivalents, with a cupola, or blast furnace, A, the whole arranged and operating in the manner set forth.

2d, In blast and cupola furnaces, making the lining of a composition of ore and flux, and renewing said lining from the outside by means and with the arrangement herein described.

3d, The combination of the box, M or M', the piston, N or N', and press, P or P', with a reverberatory furnace, arranged and operating in the manner specified.

4th, Forming the hearth of a reverberatory furnace of a concrete of ore and flux, and renewing the same from the outside, without stopping the furnace, by means and with the use of the herein described arrangement.

72,202.—SPRING BED BOTTOM.—Frank A. Huntington, San Francisco, Cal.

I claim the standard, A, with caps or tops, a, and the elastic bands or springs, B, arranged and attached to frames or bars, substantially as and for the purposes herein described.

72,203.—RAILROAD CAR VENTILATOR.—Martin G. Imbach, assignor to James L. Howard, Hartford, Conn.

I claim the combination of a reversible deflector, with a spring for moving the same, substantially as before set forth.

72,204.—STEAM ENGINE GOVERNOR.—Oliver A. Kelley, Slaterville, assignor to Lamb, Cook and Co., Forestville, R. I.

- Also the combination of the chambered nut, E, provided with an absorbent as set forth with the bolster and its chamber, e, furnished with an absorbent material, arranged so as to be against the spindle, as specified.
- Also the combination of the chambered nut, E, the chambered bolster and bushing provided with a passage and an absorbent material to extend through such passage and against the spindle, as described.
- Also the combination of the lubricating chamber, b, and its supply passage, k, with the gear, F, the bearing thereof and the conduit, e, or its equivalent, arranged in the bolster and to open against the spindle, as specified.
- 72,288.—HORSE HAY FORK.—J. S. Gochmuer, York, Pa.**
I claim, 1st, Operating the movable fork by means of an oscillating roller, C, substantially as herein shown and described.
2d, Strengthening and bracing the times by means of the roller which operates the fork, in the manner substantially as herein shown and described.
3d, The combination of the spring lever, F, with the oscillating roller, C, and the times, A, substantially as herein shown and described.
4th, The locking recess, B, when used in combination with the spring lever, F, substantially as herein shown and described.
5th, The discharge lever, K, arranged and operating in combination with the said locking recess and the spring lever, as set forth.
- 72,287.—VALVE FOR BOILER FEEDER.—Richard Gornall, Baltimore, Md.**
I claim the combination of the float, F, and valve, V, seating upward, with the chambers, C and C', the pipes, D, S, W, and the cylinder, A, the valve being attached directly to the float, F, by the valve stem, f, and the parts operating without levers or gear of any description, but substantially in the manner and for the purposes specified.
- 72,288.—BOLT-HEADING MACHINE.—Robert Gracey, Pittsburgh, Pa.**
I claim, 1st, The combination of the cam, C, the weighted drop lever, C', the toggle, F, and the heading hammer, constructed, arranged and operating together substantially as described.
2d, The combination of the cam, D, and D', the levers, E and E', the toggle, G and G', and the movable heading and gripping dies, constructed, arranged and operating together substantially as described.
3d, In combination with the heading hammer the toggle, F, the drop lever, C', and cam, C, an elastic post, stud or other elastic bearing to arrest the descent of the drop lever and cause it instantly to rebound and remove the hammer from the heated iron, substantially as shown and described.
4th, In combination with the heading and gripping dies the piston, k, and stake, s, arranged and operating as described to detach the finished bolt from the dies.
- 72,289.—POTATO DIGGER.—E. V. W. Griffith, Utica, N. Y.**
I claim, 1st, The fork, D, the bent lever, D', and the pin, G', or their equivalents, in combination, for the uses and purposes mentioned.
2d, The fork, D, operated by the lever, D', and pin, G', in combination with the screw, H, substantially as described and for the uses and purposes mentioned.
3d, The fork, D, and the bent axle, A, and lever, D', in combination, for the uses and purposes mentioned.
4th, Operating the fork automatically by means of the gearing, E and F, and the pin, G', substantially as described and for the uses and purposes mentioned.
- 72,290.—ASH HOUSE.—Moses Hall, Jr., Osborn, Ohio.**
I claim, 1st, A fire-proof ash house and leach tub combined, substantially as shown and described and for the purposes set forth.
2d, The fire-proof box, A, in combination with the hopper, B, and screen, C, substantially as shown and described and for the purposes set forth.
3d, The fire-proof leach tub, D, in combination with the parts, K, and screen, S', substantially as shown and described and for the purposes set forth.
4th, A fire-proof box, C, in combination with the fire-proof leach-tub, D, substantially as shown and described, and for the purposes set forth.
- 72,291.—MACHINE FOR SPLITTING RATTAN.—Levi Heywood, Gardner, Mass.**
I claim an independent tube or gull, E, which may be adjusted more or less in advance of the cutters, substantially as and for the purposes set forth.
- 72,292.—MACHINE FOR BENDING WOOD.—Levi Heywood, Gardner, Mass.**
I claim the molds, A and B, in combination with the lever, D, or its equivalent, all constructed to operate in the manner substantially as and for the purposes set forth.
- 72,293.—MACHINE FOR BENDING WOOD.—Levi Heywood, Gardner, Mass.**
I claim connecting the links, A, of a chain for bending wood by one or more flexible ropes, B, substantially as set forth.
- 72,294.—CINDER SHOVEL.—J. E. Hignutt, Denton, Md.**
I claim the cinder shovel herein described, constructed with a vertical handle, A, and a horizontal or nearly horizontal toothed scoop, C, D, substantially as and for the purposes set forth.
- 72,295.—BURIAL CASE.—Robert F. Hill, Philadelphia, Pa.**
I claim the body, A, provided upon its upper edge with the flange, d, projecting within and without the case, having in its under side, within the case, the counter-sunk nut, i, the corresponding flange, h, upon the lower edge of the cover, E, said flanges, secured together by the thumb screw, C, passing through both and into the counter-sunk nut, i, the head of said screw being without the cover, and the end within the body, A, as herein described, for the purposes specified.
- 72,296.—KNITTING MACHINE.—Wm. H. H. Hollen, Pastorina, Pa.**
I claim, 1st, The combination and arrangement of the wheel, B, having a groove, b', with the arm, G, of the rock shaft, H, as described and shown, for the purpose of giving the necessary movements to the stitch lifter, C, thread carrier, D, and the presser, E, and F, as described.
2d, In combination with the elements of the preceding first claim, the studs, d, b' b', in the disk-wheel, B, and the teeth, a', in the needle carrier, A, when arranged to move the said carrier, A, at the periods required by the said stitch lifter, C, thread carrier, D, and presser, E, and F, as described.
3d, Also, the grooved and beveled needle, a', in combination with the stitch lifter, C, both constructed as described, for the purposes specified.
4th, Also, the stitch lifter, C, made in the form shown, i. e., with the three projections, 1, 2, 3, for the purpose of causing the stitch lifter of the machine to operate, in combination with the grooved and beveled needle, a', in the manner and for the purposes specified.
5th, Also, the thread carrier, D, made with curved sides and edged ends, substantially as and for the purposes specified.
6th, Also, the vibrating stitch presser, E, formed as described, at its lower end, for the purpose of causing it to pass more closely along the lower sides of the needles in forcing back the stitches, as described.
- 72,297.—CULTIVATOR.—Henry Howe, Oneonta, N. Y.**
I claim, 1st, Extending the rear end of the central beam, C, back to receive and support the rear or central plow standard, D, substantially as herein shown and described.
2d, The axle-wheel frame, J, constructed substantially as herein shown and described, and pivoted to the central beam, C, or to some other support at the central part of the cultivator frame, as and for the purposes herein set forth.
3d, The combination of the lever, latch, X, with the beam, C, and axle-wheel frame, J, substantially as herein shown and described, and for the purposes set forth.
4th, Pivoting or hinging the standards, D and F, to the cultivator frame, by means of the brace-arms, G' and F', substantially in the manner herein shown and described, and for the purposes set forth.
- 72,298.—AUTOMATIC RAIN CONDUCTOR.—James B. Hudson, Fayetteville, Pa.**
I claim the cylinder, A, having a removable cover, B, and provided with a hopper, E, strainer, a, partition, B, pivoted disk, D, operated by float, F, and rod, H, and pipes, m and w, as constructed, arranged, and operating substantially as and for the purposes specified.
- 72,299.—MACHINE FOR TRIMMING HEDGES AND CUTTING CORN.—John W. Hall, Conserville, Ind.**
I claim, 1st, The combination of the frame, A, the hinged wheel, B, the cog-driving wheel, C, connected with gearing to move the horizontal shaft, e, and the rod, f, with e, the rotating disk, g, the hedge-cutting knives, h, h', the forked guide, H, and the treadle, E, arranged and operating substantially as and for the purposes herein described.
2d, The combination of the main frame, A, the side frame, I, I', the forked cornstalk cutter, S, the fixed arm, m, the pivoted wheel, n, the treadle, E, arranged and operating as and for the purposes herein set forth.
- 72,300.—FOOT POWER.—Ezra Hutson, Brockport, N. Y.**
I claim the rollers, d and e, ratchet, g, and pawls, m and n, the whole combined substantially as and for the purposes herein set forth.
- 72,301.—VEGETABLE CUTTER.—Eros B. Ives, Bristol, Conn.**
I claim the wheel, E, provided with knives, g g' and e e', substantially as described.
- 72,302.—DOOR BOLT.—C. C. Jones, Portland, Me.**
I claim the combination of bolt, e, knob, e, and spring, f, in the case, s, with the plate, z, substantially as and for the purposes herein described.
- 72,303.—SLED.—George F. Krollpfeiffer, New York City.**
I claim the attachment to sleds, sleighs, and other land conveyances, consisting of a pivoted frame, B, rod, E, and handles, F, substantially as and for the purposes specified.
- 72,304.—HORSE HAY FORK.—Mary Jane Laird, Middletown, Pa., administratrix of the estate of Andrew J. Laird, deceased.**
I claim the guard, D, when applied to hay forks for the protection of the lever or arm, substantially as described and for the purposes set forth.
- 72,305.—PLOW.—S. J. Leach, Tuscaloosa, Ala.**
I claim, 1st, Facing the mold-board of a plow with a thin detachable sheet or plate of wood, steel, or other suitable material, substantially as herein shown and described, and for the purposes set forth.
2d, Forming the mold-board, B, of a plow with a shoulder, b', and with slots or sockets, C, to receive the forward edge and tongues of the facing-plate, D, substantially as herein shown and described, and for the purposes set forth.
- 72,306.—LAMP CRIMNEY CLEANER.—George Leas, Shirleyburg, Pa.**
I claim the lamp chimney cleaner, as described, the disk, B, of which is provided with a serrated metallic flange, as herein set forth.
- 72,307.—SEAT FOR VEHICLES.—John R. D. V. Linton, New Bedford, Mass.**
I claim, as a new article of manufacture, a cast-metal seat riser, made substantially as herein shown and described.
- 72,308.—BEE HIVE.—Joel R. Martin, Martinsburg, Ind.**
I claim, 1st, The block, G, connected to the end of the tube, A, and provided with its cleats, d, d', pivoted as set forth, and for the purposes set forth.
2d, The combination of the hive, A, as constructed, with block, G, having cleats, d, d', and supported by the standards, H, H', above the pyramidal-shaped block, E, all constructed and used for the purposes set forth.
- 72,309.—PROTECTING STEAM BOILERS FROM CORROSION.—David Matthew, Franklin on Chelan, Wis.**
I claim a galvanic pile, which is composed of copper and zinc plates, or other metal equivalent, in galvanic properties, applied upon a metal rod, which is provided on its ends with supporting disks, said pile being employed substantially in the manner and for the purposes described.
- 72,310.—CHURN.—James Maxey, Kewanee, Ind.**
I claim the arrangement of the churn-body, A, standards, H, H', shaft, I, wheels, G and F, and staff, B, provided with the wheel, D, and the paddles, C, C', as and for the purposes set forth.
- 72,311.—TRACE FASTENER.—Ira C. McAllister, Milo, Mich.**
I claim the buckle constructed as described, consisting of the frame, E, having parallel side guards, F, and ear pieces, G, through which the rivets, H, pass, and slotted upon its upper side to receive the lever, M, hung by a hook, B, and cross pin, b, upon which it slides, and provided with the tongue, L, at one end, its other end fitting upon the surface, P, of the buckle frame, as herein described, for the purposes specified.
- 72,312.—BACK-BAND FASTENER.—David L. McGregor, Charlestown, Mass.**
I claim the metallic band-fastener, e, in combination with a saddle, substantially as described, and for the purposes set forth.
- 72,313.—SASH STOPPER.—J. N. McIntire, New York City.**
I claim the catch or cam-like hook, so constructed and arranged as to interlock with and disengage from suitable pins or projecting stops in substantially the manner described, for the purposes set forth.
- 72,314.—WINDOW-SASH SUPPORTER.—John S. Merrill, New York, Md.**
I claim the use of the self-acting metallic roller, D, in combination with the inclined metallic box, C, in the one side of the sash, and two friction rollers, E, E', attached to the opposite side of the sash, when arranged, combined, and operating with the sash, as herein described and for the purposes set forth.
- 72,315.—HORSE RAKE.—Myron Miles, Middlesex, N. Y.**
I claim the combination and arrangement of the hinged draw-bars, D, D', guide-standard, G, connecting rod, H, brace bars, M, M', and stop, L, substantially as herein specified.
Also, the slots, m, in the brace-bars, and the springs, e, in combination with the stop, L, for the purposes specified.
2d, The elastic bearing to arrest the descent of the draw-bar, D, in combination with the rake, and with the draw-bars, D, D', substantially as and for the purposes herein set forth.
- 72,316.—WASHING MACHINE.—Jehu Mitchell, Newark, O.**
I claim the frame, L, hung by arms, H, H', to bar, T, when provided with pins, I, I', and weight, P, in combination with the box, A, having standards, D, D', and cross pin, b, upon which it slides, M, all constructed, arranged, and operating as and for the purposes set forth.
- 72,317.—VENTILATOR FOR FLOUR MILLS.—Christopher Moegling, Milwaukee, Wis.**
I claim, 1st, In connection with an ordinary open-top curb, the stops, i, m, n, and their equivalents.
2d, The educting pipe, D, when provided with the water stops, k, k', or whether said pipe leads off from the curb, B, or from the receptacle, C, for the purposes specified, either with or without the aid of the wings, E.
3d, The vertically-adjustable frame, F, when used as and for the purposes specified.
- 72,318.—SEED PLANTER.—William R. Mozier, Higginsville, Ill.**
I claim the combination of the trigger or hand lever, J, spring, L, lever, I, connecting bars, K and H, crank, G, recessed cylinder, F', and seed box, E, with each other and with the forward plow standard, B, plow beam, A, and handle, D, substantially as herein shown and described, and for the purposes set forth.
- 72,319.—PROPELLER.—Nicholas Nolan, New York City.**
I claim the blades or paddles, D, D', fitted in the rock frame, B, and operated from the driving shaft, K, through the medium of the crank wheel, J, and connecting rod, I, or their equivalents, in combination with the rock, M, attached to the crank, L, on the driving shaft, and provided with the hook, T, and shoulder, J, to catch over pins, b, b', the bevel segment, H, and the bevel wheel, G, on shaft, F, connected with the bar, E, all being arranged to operate in the manner substantially as and for the purposes set forth.
- 72,320.—SAIL-RELEASING APPARATUS.—Ferd. Gust Oehme, M., Plymouth, Mass.**
I claim, 1st, Connecting the sail to the boat by means of an apparatus formed by the combination of inclined planes, spiral springs, and double-acting hooks, substantially as herein shown and described, and for the purposes set forth.
2d, The combination of the perforated grooved and slotted block, A, adjustable flanged blocks, E, and G, springs, H, coiled spring or springs, B, pin, D, block, J, and hooks, K, with each other, substantially as herein shown and described, and for the purposes set forth.
- 72,321.—HORSE HAY FORK.—Sam'l. Page, McAlisterville, Pa.**
I claim the bar, C, having a slot at its upper end, through which is passed the lever, D, said bar being provided with the curved teeth, G, G', and in combination with the bars, B, B', having pointed head, H, and times, A, all operating as specified.
- 72,322.—MODE OF TREATING SPONGE FOR PRODUCING TEXTILE FABRICS.—Alfred Paraf, Mulhouse, France.**
I claim the herein described method of treating sponge to convert the same into a textile fabric, as described, spin, &c.
- 72,323.—LIFTING APPARATUS FOR GRAIN DRILL.—C. E. Patric, Macdon, N. Y.**
I claim, 1st, The employment of the racks, R, and pinions, w, in connection with the hand-lever, F, and shaft, H, for the purposes set forth, whether the lifting-chains are made to wind upon the shaft or not.
2d, The employment of the locking-intel, D, with the shaft, H, when it is also made to act as a support, substantially as and for the purposes set forth.
3d, The arrangement of the guards, G, with the racks, R, and pinions, w, substantially in the manner herein shown and described, and for the purposes set forth.
- 72,324.—CORN.—William Pauly, College Point, N. Y.**
I claim the combination of the two side-combs with the spring by which they are connected substantially as described.
- 72,325.—BELT-FASTENER.—C. O. Pike, North Leverett, Mass.**
I claim, 1st, The half-collar, a, and the clamping-wedge, c, for fastening the ends of a belt, constructed and operating substantially as described.
2d, The double levers, d, d', constructed and operating as described, in combination with the clamping-wedge, c, and for the purposes set forth.
- 72,326.—PORTABLE EVAPORATOR.—H. L. Plumb, Hamer, O.**
I claim the longitudinal partition, F, over the fire-chamber, as and for the purposes set forth.
The grate, J, constructed and operating in the manner shown and described.
The damper, arranged and operating in the manner shown and described.
The arrangement of the portable evaporator with a jacket of sand or earth, substantially in the manner and for the purposes set forth.
In combination with the fire-box and evaporating-pan of a portable evaporator, the cover, I, secured in place by screws or clamps, and provided with pins, b, b', or their equivalents, for the purposes set forth.
- 72,327.—VISE.—H. K. Porter and T. W. Porter, Boston, Mass.**
We claim, 1st, Controlling the sliding levers of vises by means of a spring, whose pressure may be varied at will by a screw inserted in the head of the vise-screw, substantially as set forth.
2d, The combination of the plunger, the spring, and set-screw, substantially as and for the purposes set forth.
- 72,328.—WASHING MACHINE.—G. Reney and J. Keiss, Cedar Falls, Iowa.**
We claim, 1st, The vertical shaft, D, having vertical wings or flanges, F, rigidly attached to it, and perforated disk, C, having radial flanges, F', rigidly attached to it, said shaft and disk being rigidly connected together, in combination with the corrugated tub, A, substantially as herein shown and described, and for the purposes set forth.
2d, The combination of the crank, M, shaft, K, bevel-gear wheels, N and L, and cover, G, with each other, with the winged or flanged shaft, D, and flanged disk, C, and with the corrugated tub, A, substantially as herein shown and described, and for the purposes set forth.
- 72,329.—HOISTING JACK.—S. B. Rittenhouse, Plymouth, Ind.**
I claim, 1st, The spring, which is attached to the side of the box, A, and forming its front side arranged in relation therewith, and with the pawl, f, as herein shown and described.
2d, The construction and arrangement of the box, A, spring, e, pawl, f, projection, B', upon hoisting-gear wheels, b, cog-shaft, C, shaft, D, and pinion, E, as herein set forth, and for the purposes set forth.
- 72,330.—BRICK MACHINE.—Wm. F. Shanks, Louisville, Ky.**
I claim, 1st, The combination of the parts, H, H', Q, Q', R, uprights, F, F', the screw, E, and the sliding plate, G, substantially as described, and for the purposes specified.
2d, In combination with the above, the rod, m, attached to the crank, B, belt, s, cogs, b, and rod, E, substantially as described, for the purposes specified.
3d, The sliding plate, G, operated by means of the cogs, D, and rod, E, substantially as described, for the purposes specified.
4th, The roller, A, adjusted by means of the cogs, b, and crank-wheel, B, whereby the thickness of the stream or column of mud is regulated, substantially as herein shown and described.
- 72,331.—WATER-WHEEL.—H. W. Shipley, Portland, Oregon.**
I claim the combination and arrangement of the conical hub, F, and radial buckets, C, C', when arranged at the bottom of the shaft, A, with the upper ring, r, constructed with exterior and interior flanges of the shape described, the lower ring, r', and the exterior buckets, D, E, forming a water-wheel which operates in the manner and for the purposes specified.
- 72,332.—INSIDE WINDOW-BLIND.—S. W. Shorey, Galesburg, Ill.**
I claim, 1st, An inside window-blind, constructed, arranged, and operating substantially as herein shown and described.
2d, The combination of the frame, A, having the grooves, a, webbing, c', slats, D, frame, B, and hinges, C, as herein described, for the purposes specified.
3d, The combination of the adjustable frame B, with the grooved frame A, for closing and holding in a closed or partially closed position, the slats of a window blind, as herein shown and described.
- 72,333.—SEED PLANTER.—John Stark, Thomasville, Ga.**
I claim, 1st, The arrangement of the vertical arbor, e, carrying revolving arms, i and j, respectively below and above the bottom of the seed box, substantially as herein shown and described.
2d, The frame F, of a seed planter, when hinged to a supporting frame A, and when connected with the same by means of supports b b', all made and operating substantially as herein shown and described.
3d, The funnel-shaped lower part, i, of the seed box, when secured to the frame F, in combination with the hopper J, secured to the frame A, all made and operating substantially as herein shown and described.
4th, The driving wheel C, when connected with the hopper J, by means of suitable rods or shafts with the revolving arbor e, having the arms i and j, all made and operating substantially as herein shown and described.
5th, The arrangement and combination with each other of the plow N, tube R, share O, sifter P, adjustable marker R', seed dropper J, shares S, and roller D, all made and operating substantially as herein shown and described.
- 72,334.—HARROW.—Nicholas Starr, Jr., Homer, N. Y.**
I claim, 1st, Constructing a harrow of four staves, in two sections or divisions, and each division composed of two sides hinged together, and said divisions connected at the diagonal corners to form a single square harrow.
2, Also, the connecting or coupling rod c, with its bolts at either end, to connect such divisions together and keep the sides expanded.
72,335.—MANUFACTURE OF IRON.—David Stewart, Kittanning, Pa.
- I claim purifying the pig-iron or blast-furnace metal from its carbon and other impurities by passing it in a stream through ozone, atmospheric air, or other oxygen-bearing gas or vapor, substantially as and for the purposes hereinbefore described.
- 72,336.—EXCAVATOR.—B. T. Stowell, Quincy, Ill.**
I claim the flues E, E', and damper D, in combination with the lid B, and chamber, C, the whole constructed and operated substantially as and for the purposes set forth.
- 72,337.—TIRE HEATER.—Harry Stroud, Jr., Clinton, Ill., assignor to himself and R. W. Robinson.**
I claim the flues E, E', and damper D, in combination with the lid B, and chamber, C, the whole constructed and operated substantially as and for the purposes set forth.
- 72,338.—CHURN.—Clark M. Terrall and Nathan W. Husey, Oskaloosa, Iowa.**
We claim the combination of the grooved base A, churn G, standard B, with button E', and lever C, provided with an adjustable metal plate D, for connecting the dasher E, the whole constructed, arranged, and operating in the manner as specified.
- 72,339.—BASE-BURNING STOVE.—Joel Tiffany, Albany, N. Y.**
I claim the use or employment of downward streams or jets of hot air upon the surface of the burning fuel, in combination with lateral streams or jets of cold air, taken over the sides, or other parts, through the fire pot, and specially directed or conducted by means of tubes, projecting plates or other equivalent means, so as to meet the streams or jets of hot air, at the point of impingement upon the surface of the burning fuel, substantially as set forth.
- 72,340.—PISTON-ROD PACKING.—Sidney S. Turner, Westboro, Mass.**
I claim tubular elastic packing, confined rigidly by its ends, so arranged as to be compressed laterally against the rod by the direct action of the steam or other medium of pressure, substantially as and for the purposes set forth.
- 72,341.—CLOTHES DRYER.—Joshua Walker, Kansas City, Mo.**
I claim the frames A' and B, the cord C, and sleeve e, when combined and arranged as set forth.
- 72,342.—COOKING STOVE.—Geo. W. Walker, Boston, Mass.**
I claim, 1st, A cooking stove with a flame and smoke flue at the back of the oven, an oven-ventilating flue or flues, arranged to operate substantially as set forth.
Also, a provision upon the oven door for swinging articles into and from the oven, and arranged to be folded out of the way when not in use, substantially as set forth.
Also, in combination with the fire pot and ash pit, the sifting chamber, provided with a sliding grate, substantially as set forth.
Also, in combination with such sliding grate, the opening at the end of the sifting chamber for obtaining access to the grate, in connection with a protecting wall or plate, substantially as described.
Also, in combination with such sifting grate, the scraper bar, to dislodge the coal when the grate is drawn out, substantially as set forth.
Also, the construction of the sifting grate with diagonal bars, substantially as and for the purposes set forth.
- 72,343.—TIDAL-WATER ELEVATOR.—Philip Weck, Brooklyn, N. Y.**
I claim, 1st, The box F, and buoy J, in combination with the chain E, and weight G, toothed pulleys D D', H, ratchets K K', and pawls L L', all arranged to operate in the manner substantially as and for the purposes set forth.
2d, The pendant S, attached to the pawl L, in connection with the rods M, which connect the pawls L L', to insure a simultaneous detachment of the pawls from their ratchets K K', and a simultaneous application thereof, substantially as and for the purposes specified.
3d, The float V, connected with the valve lever T, in box F, and arranged to operate in the manner substantially as and for the purposes set forth.
4th, The supplemental chain U, applied to the chain E, and buoy J, substantially as and for the purposes specified.
- 72,344.—PITMAN.—Thos. Welch, Churchville, N. Y.**
I claim, 1st, A skeleton or shell pitman for harvesters, made of suitable cast metal, the skeleton or shell held to receive the crank-pin box being cast to and with the pitman, for the purposes set forth.
2d, The crank-pin boxes with spherical bearings, in combination with a skeleton or shell pitman, as and for the purposes specified.
3d, A set screw having a concaved end, when used with the pitman head and crank-pin box in harvesters, for the purposes set forth.
- 72,345.—MODE OF PROTECTING LIKENESSES IN MONUMENTS.—Isaac H. Wells, Pagetown, Ohio.**
I claim, 1st, The elastic packing C, e, e', c', applied and compressed between the surface of the monument and the frame and stone, substantially as and for the purposes specified.
2d, The combination of the bars D, holes b, screw d, back E, and flange b, substantially as described.
3d, In combination with the frame B, the removable door or shutter F, for excluding light from the surface of the picture, when the same is constructed and applied substantially as set forth.
- 72,346.—BOX FOR PRESERVING CORPSES.—Peter Wendhiser, Rockville, Conn.**
I claim the corpse table C, with the removable metallic cover E, having the opening F, when said table is supported upon legs, D, and placed within the wooden inner box, B, and provided with the metallic lining, H, and the water-tight pipes H', all constructed as described for the purposes specified.
- 72,347.—LOCKING-KNOB LATCH FOR DOORS.—Jacob Wertin, La Grange, Ind.**
I claim, 1st, The curved dog G, constructed substantially as herein shown and described, in combination with the sliding frame D, as and for the purposes set forth.
2d, The hollow stem or tube J, having a slotted arm K, attached to or formed upon it, substantially as herein shown and described, and for the purposes set forth.
3d, The combination of the plate L, with its adjustable ward or wards, with the hollow stem J, and slotted arm K, substantially as herein shown and described, and for the purposes set forth.
- 72,348.—STEAM JET FOR CLEANING BOILER TUBES.—Joel M. Wheeler, Oxford, Conn.**
I claim the head A, constructed with inclined slots or openings, substantially as herein shown and described, and for the purposes set forth.
- 72,349.—HARVESTER.—William N. Whiteley and Andrew Whiteley, Springfield, Ohio.**
We claim, 1st, The combination of the spring t, or its equivalent, with a harvester's adjustable lever, for the purposes specified.
2d, The combination of the adjustable piece p, with the rear end of the harvester's tongue, substantially as set forth.
3d, Attaching the draught bolt R, Fig. 3, by which the team draws the machine to the outer side of the tongue (that next the uncult crop), to obtain the advantages stated.
4th, The combination of an adjustable draught point, by which the team draws the machine, and an adjustable driver's seat, and a detachable grain platform, in a harvester, for the purposes specified.
5th, The construction and connection of the main frame and driver's seat of a harvester in such a manner that this seat can be shifted from one to another of the herein-described places upon the frame, for the purposes stated.
6th, The platform B, or an equivalent thereof, constructed and connected to the inner bar and divider, in the manner and for the purposes set forth.
7th, The following arrangement of parts in a harvesting machine: The finger bar, substantially at right angles to its line of forward movement; the grain wheel, located so that some portion of its hub shall be in the same vertical plane with the finger bar; the finger bar further backward than the grain wheel, placed so that its end shall be as far forward as the point of the divider; a supporting metal plate, which always has a portion lower than the finger bar, and firmly secured thereto, while the divider and part of this plate are firmly connected by screw bolts.
8th, The adjustable guiding board K, constructed and connected to the divider, as shown and described, and for the purposes specified.
9th, Constructing and connecting a journal of a harvester's reel shaft to said shaft, substantially as described, for the purposes specified, whether the reel pulley be made a part of this journal or not.
10th, In a harvester rake, the outer tooth of which moves over the platform faster than the inner tooth, and the points of the teeth faster than their other ends, connecting the inner end of the rake head to the main frame by means of a ball-and-socket joint, or its equivalent, the moving parts of which can always be kept in snug working order, as set forth.
11th, Making the post i', provided with a ball at its upper end, or an equivalent thereof, laterally adjustable, as and for the purposes specified.
12th, Making the post i', provided with a ball at its upper end, or an equivalent thereof, vertically adjustable, as and for the purposes set forth.
13th, Placing the center of motion of a harvester's automatic rake at the front edge of the head of said rake, as and for the purposes set forth.
14th, In a harvester's automatic rake, the outer end of which moves over the platform faster than the inner tooth, and removes the gavel heads foremost, the guiding arch X, which is above the rake head, and further inward than the inner tooth, and by which said rake is raised up above the platform during its forward stroke.
15th, The arch X, constructed and combined with arch Y, substantially as shown and described, for the purposes specified.
16th, The combination of a guiding arch X, and the rake carrier S, or an equivalent thereof, with a harvester's automatic rake, which has the outer gavel heads foremost, the platform faster than the inner tooth, and removes the gavel heads foremost.
17th, Combining with a harvester's automatic rake, which has its outer tooth moved over the platform faster than the inner tooth, and removes the gavel heads foremost, an arch, to carry the rake forward over the next gavel, when said device is provided with a latch which drops behind a part of the rake head as it passes backward, and compels said rake to come forward over the next gavel.
18th, The combination of the spring S, carrier S, and arch X, or an equivalent thereof, with a harvester's automatic rake that has the outer tooth moved over the platform faster than the inner tooth, and removes the gavel heads foremost for the purposes specified.
19th, Making the latch spring S, adjustable, for the purposes specified.
20th, The combination of the adjustable gage plate S, with the front portion of the arch X, for the purposes specified.
21st, The combination of the spring B, or an equivalent thereof, with a harvester's automatic rake, the outer end of which moves upon a center at the inner end, and is carried forward over the cut grain by means of the arch X, or an equivalent thereof.
22d, The rake projector A, constructed as described, and connected with the head of a harvester's automatic rake, for the purposes specified.
23d, The rake's adjustable and removable foot board, constructed and

and slotted bottom, D, arranged with the slotted plates, E, with their rollers, H, for the vertical adjustment of the mold frame, F, provided with its knives, I, all constructed and operating as and for the purposes set forth.

72,423.—MANUFACTURE OF CORRUGATED BELLS.—George S. Saxton, St. Louis, Mo.

I claim the bell, A, when it is formed in corrugations, substantially in the manner and for the purposes set forth.

72,423.—MACHINE FOR FILLING HORSE COLLARS.—August Seelick and Henry Hildenbrand (assignors to themselves, F. C. Krayer and C. R. Schrick), St. Louis, Mo.

We claim, 1st, the scraper or scrapers, f, f', and their combination with the rock shaft, f, substantially as and for the purposes set forth.

2d, The combination of the rotating shaft, h, and its prongs, b, with the rock shaft, f, and its prong, i, substantially as set forth.

3d, The eccentric bar, g, the shaft, f, and the shaft, h, when combined and acting substantially as and for the purposes set forth.

4th, The combination of the eccentric bar, g, with the shaft, substantially as and for the purposes set forth.

5th, The arrangement of the partition piece, k, in the hopper, F, substantially as and for the purposes set forth.

72,424.—WAGON SEAT.—Jacob Sebastian, New York city.

I claim the spring arms, B, links, a, and spring slides, D, in combination with the seat, A, and springs, C, substantially as and for the purposes set forth.

Also, the loops, b, and screws, c, in combination with the uprights, C, spring slides, D, arms, B, and seat, A, constructed and operating substantially as and for the purposes set forth.

72,425.—WAGON SPRING.—Jacob Sebastian (assignor to himself and Lewis Seal), New York city.

I claim, 1st, A clamp, A, composed of cross bars, a, b, keys, c, and wedges, d, to act in combination with the clips, D, substantially as and for the purposes set forth.

2d, Providing the edges of the leaves of the spring with grooves or notches, to admit the edges of the keys, c, substantially as and for the purposes set forth.

3d, Providing the spring, at one or both ends, with an oblong eye, substantially as and for the purposes set forth.

72,426.—STEAM BLOWER.—L. F. Smith, Philadelphia, Pa.

I claim, 1st, The spreader, E, constructed and arranged within the pipe, A, with its partitions, B, B', in the manner and for the purposes set forth.

2d, In combination with the spreader, E, in the pipe, A, with its partitions, the solid pipe or casing, D, having orifices, e, e', and screw thread, all constructed and operating as specified.

72,427.—GAGE FOR SETTING WAGON AXLES.—David F. Stratton, Cincinnati, Ohio.

I claim a reversible gage for the purpose set forth, having on one side the adjustable standard, H, fixed standard, C, and adjustable swing, D, and on the other the longitudinally adjustable standard, B', fixed standard, G, and vertically adjustable standard, H, when constructed to operate substantially as described.

72,428.—ARTIFICIAL PLATE FOR TEETH.—Leander R. Street, Chelsea, assignor to Alfred B. Ely, Newton, Mass., trustee.

I claim, 1st, The use of hard resins, or resinous bodies, mixed with fibrous or textile materials, and shaped by means of heat and pressure, substantially as described.

2d, The use of this plate of metal, horn, shell, gutta serena, wood, or other suitable material, capable of being pressed into shape, between or in combination with layers of resins and fibrous compound, as and for the purposes substantially as described.

3d, Also, as a base for artificial teeth or gums, the use of fibre or fibrous material, saturated or mixed with lac, or other suitable substance, which, when heated and pressed, will assume the proper shape, and possess or acquire the proper hardness and elasticity, substantially as described.

72,429.—COFFEE MAKER.—J. Warren Thynge, Salem, Mass.

I claim the conical distributing chamber, f, arranged under the condenser, substantially as and for the purposes herein specified.

Also, the inverted perforated cone, i, in the bottom of the receptacle, B, in combination with the distributing chamber, f, substantially as and for the purposes specified.

Also, the extended flange, m, on the receptacle, for the purposes specified.

Also, the combination of the condenser, A, constructed substantially as described, with the receptacle, B, constructed substantially as set forth.

72,430.—TONGUE-SUPPORT FOR RAILROAD STREET CARS.—John M. Tiernan, Pittsburg, Pa.

I claim the mode of supporting the tongues of street-cars and other vehicles or machines, in the same or being moved from place to place, or changed from one end of a car to the other, by the use of a curved or bent metallic bar or rod, attached to or swung under the tongue, together with the mode of operating the said bar by a lever fastened thereto acting against a bolt fixed to the tongue over the said bar, as the same is herein above described.

72,431.—MANUFACTURE OF LIQUIDS FOR MAKING ICE, AND FOR OTHER PURPOSES.—Plester Hend, Vander Weyde, Philadelphia, Pa.

I claim, 1st, The manufacture of hydride of propyl or chimogene, from the so-called non-condensable gases escaping from any petroleum still, by condensing them in a coil exposed to a freezing mixture, or by submitting them to a potential pressure of a pump, or by both.

2d, The rolling of crude or refined petroleum at the common temperature by the action of a vacuum, agitating it, and condensing the vapors produced by cold or pressure, or by both, thus producing a highly volatile liquid, boiling at about 100° Fahrenheit, and corresponding with hydride of ethyle.

3d, The application of these liquefied gases, or of gasoline, or any other very volatile product of petroleum, to the making of ice and of cooling in general.

4th, The temporary preservation of dead bodies by the perfectly dry cold produced by placing in the coffin one or more long, narrow cylinders filled with the above described liquefied hydrocarbon gases, or with liquefied sulphurous acid, carbonic acid, or nitrous oxide, or their equivalents, from which cylinders the gas is slowly escaping, regulated by a stop-cock, and thus maintaining in the desired low temperature the escaping gas at the same time serving as a preservative and disinfectant.

5, The use of the above described or other products of petroleum, or the use of crude petroleum, when escaping, either by their own pressure, or produced, as a spray, by the action of a blast of air, oxygen or nitrous oxide, for an anæsthetic and heating agent, either under a steam-boiler using petroleum, in combination with a blast of air or steam, or both, as above described, or for a lime-light or blow-pipe, requiring only two very small vessels, each containing one of the liquefied gases—petroleum gas and nitrous oxide gas—as substitutes for the non-condensable bydrogen and oxygen.

72,432.—TAKING THE FORM AND MEASURE OF GENTLEMEN TO CUT COATS AND VESTS.—Theodore Vandoren, Sr., Washington, D. C.

I claim the use of a series of jackets, with the seams thereof formed as herein described, in combination with the patterns, to correspond with said jackets, when said jackets and patterns are used together in the manner described, as a system for cutting gentlemen's coats and vests, herein fully set forth.

72,433.—DIVIDER.—O. E. Weatherhead, Winchendon, Mass.

I claim the device for holding a pencil, point, or pen upon the dividers, consisting of the elbow, C, piece, b, with groove, c, and clamp, F, with set-screw, b, arranged and combined substantially as described.

72,434.—BREACH-LOADING FIRE-ARM.—D. B. Wesson, Springfield, Mass., assignor to the Wesson Fire-Arms Company.

I claim the slide, D, pushing-bar or bars, m, and studs, b', arranged in relation with each other, and with the extractor, C, and pivoted bar, k, substantially as and for the purposes specified.

72,435.—PEN-HOLDER.—H. F. Wheeler, Boston, Mass.

I claim a pen-holder, having sockets for two pens, substantially as described.

72,436.—BORING TOOL.—Albert Wippo, Chicago, Ill.

I claim the above described tool for shaping the ends of the legs of furniture, constructed to operate substantially in the manner and for the purposes set forth.

72,437.—STOVE-PIPE DAMPER.—G. B. Wiseman, Sycamore, Ill.

I claim a damper, B, provided with a sliding rod, which has a cylindrical and two or more rectangular portions, constructed substantially as and operating in the manner set forth.

72,438.—LAND ROLLER.—Wm. S. Worley, Tusculia, Ill.

I claim the rollers, B, B', provided with the bands, C, C', and shovels, b, b', when arranged upon the frame, A, in the manner and operating substantially as and for the purposes herein specified.

REISSUES.

56,870, dated August 7, 1866; reissue 2,811.—TWEED.—John Baylis, New York city.

I claim a tweezer, A, having a water chamber, B, provided with connecting water and steam pipes, D and E, in combination with the air pipe, G, air chamber, I, and end air pipe, J, arranged together and operating substantially as and for the purposes represented and described.

49,354, dated August 8, 1865; reissue 2,812.—HORSE HOE CULTIVATOR.—R. B. Dunn and John C. Flint (assignees by mesne assignments of Albion Webb), Bangor, Me.

We claim, 1st, Securing the share to a plate in such manner as to be readily removed thereon, or secured thereto, substantially as described.

2d, The employment of teeth or cogs as a means of adjustment, and holding in position a movable blade, substantially as described.

3d, Providing a wing or blade, and the part to which it is connected, with a rib in one end and a series of notches or grooves in the other, to set and hold the blade in position.

4th, In combination with such rib and notches, a bolt and nut, or their equivalents, to loosen and tighten the same, as described.

5th, Supporting the forward ends of the share-supporting plate by means of screw-threaded rods entering screw-threaded eyes on the plate, to admit of lowering or raising the share, substantially as shown and described.

6th, Providing the cross bars with slots, or their equivalents, as and for the purposes described.

7th, The curved support, D, made of a single block, when constructed and applied as and for the purposes described.

59,588, dated November 13, 1866; reissue 2,813.—CHIMNEY HOLDERS FOR GAS BURNERS.—Elliot F. Gleason, New York city.

I claim, 1st, The spring or strip forming the spring, I, bent and curved substantially as described.

2d, The spring, f, riveted to the arm, n, substantially as set forth.

3d, The equalizing spring for chimney holders, constructed substantially as set forth.

30,959, dated July 20, 1868; reissue 2,814.—RAILWAY SWITCH.—Marion Smith, Ithaca, N. Y., assignee by mesne assignment of George R. Smith.

I claim, 1st, The described rack and pinion at the base of a perpendicular rotating or partially rotating shaft, when combined with a spring lever and a circle or segment of a circle, said lever being fixed at right angles to the said shaft, and playing on said circle or segment, and into slots in the same, and said segment or circle being horizontal.

2d, Also, the above-named combination, when further combined with a signal lantern, which lantern revolves wholly or in part when adjusted to the top of said shaft, said lantern having different-colored glasses, and revolving on an axis drawn perpendicularly through the center of said lantern.

3d, Also, when in connection with a railroad switch and adapted thereunto, the construction and arrangement of the shaft, a, the hand lever, h, and the segment or circle, g, as described.

4th, The arrangement and adaptation of the segment or circle, hand lever and shaft just named, to its frame, holding up the shaft, a, so that the shaft and hand lever shall revolve together, and the segment or circle be fixed or stationary about the shaft, as described.

5th, The construction of the segment, g, with slots to receive the lever, h, at the places or points requisite for the switch changes, as described.

6th, The construction of the hand lever, h, so as to be self or readily operated by the spring, f, in the named places or points of switch changes in the said segment, as described.

7th, The combination, with the shaft, a, hand lever, h, and segment or circle, g, of the rack and pinion, b, c, and rod, e, e, and changeable track or tracks, as described.

57,006, dated August 7, 1866; reissue 2,815.—HYDRAULIC MAINS OR GAS WORKS.—L. K. Stanley, Brooklyn, N. Y.

I claim an improvement in hydraulic mains for gas works, the combination with the main, C, of the external supply tubes, D, cast with or made separately from and attached to the main, and communicating with the same below the water or fluid therein, substantially as and for the purposes herein set forth.

62,084, dated February 13, 1867; reissue 2,816.—WASH BOILER.—M. W. Staples, Catskill, N. Y.

I claim, 1st, In combination with a portable wash boiler, having a perforated partition or diaphragm, E, made as described, one or more tubes or conduits, D, arranged and operating substantially as hereinbefore set forth.

2d, Also, the water space, or chamber, B, in a portable wash boiler, provided with a perforated partition, E, made as described, and conduits, D, made and operating in the manner and for the purposes hereinbefore set forth.

64,163, dated April 23, 1867; reissue 2,817.—HORSE HAY FORK.—A. R. Sprout, Huguesville, Pa.

I claim, 1st, Providing the extreme penetrating point or points of a horse hay fork with a cutting edge or edges for cutting its way into the hay, said point being so constructed that they can be operated so as to catch and hold in the hay for elevating it and be released at will from the hay for discharging it.

2d, The conform points, f and g, provided with cutting edges, and shoulders and hooks, e and f, constructed, arranged, and operating substantially as herein described and for the purposes set forth.

54,431, dated May 1, 1866; reissue 2,818.—HORSE HAY FORK.—Ariel B. Sprout, Picture Rocks, Pa.

I claim, 1st, Combining in one implement a hay elevator and hay cutter, so constructed that, when used as an elevator, it will cut its way into the hay, and so operating that it will catch in the hay for elevating it, and then may be released at will from its hold in the hay for discharging it, substantially as described.

2d, The combination and arrangement of the bars, A and B, provided with bars and cutting edges at their lower extremities, and levers, n and w, substantially as herein described, and for the purposes set forth.

DESIGNS.

2,848.—WINDOW FASTENER.—G. B. Kirkham, N. Y. city.

2,849.—PAPER COLLAR.—Wm. F. Moseley, Brooklyn, N. Y.

2,850.—OIL CLOTH PATTERN.—James Patterson, Elizabeth City, N. J., assignor to W. W. Gearn & Co., Newburg, N. Y.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissues of

the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & CO., 37 Park Row, N. Y.

26,908.—MANUFACTURE OF BOOTS AND SHOES.—William N. Ely, Stratford, Conn., assignee by mesne assignments of Frayre D. Ballou, Abington, Mass. Dated Jan. 10, 1866. Application for reissue received and filed Dec. 5, 1867.

I claim attaching by sewing mechanism the welt sole or welt strip of leather etc. to the upper of boots and shoes, substantially as described.

199 (whole No. 31,203).—SEWING MACHINE.—William N. Ely, Stratford, Conn., assignee by mesne assignments of F. D. Ballou, Abington, Mass. Dated Jan. 22, 1861. Application for reissue received and filed Dec. 5, 1867.

1st, I claim attaching the sole of boots and shoes by sewing them to welts or tapes, or their equivalents, by sewing machinery, substantially as described.

2d, Cutting away the table, A, or part where the work is to be supported and the needle to operate so as to present the work to the needle with greater facility for stitching the shanks of shoes or concave lines of work, etc., near the edges thereof, substantially as described.

3d, Raising or projecting upward a lip or standard, c, above the adjacent parts of the machine for the purpose of supporting the article at the point of sewing, substantially as described.

4th, Interposing a guard or guard plate between the needle or awl or both and the upper or raised part of the leather, substantially as described.

5th, The adjustable foot, C, when used as a guard or gage, or both, substantially as described.

6th, The lip or standard, c, when used as a guard or gage or support, or all of them, substantially as described.

7th, The moving carriage, E, for aiding the forward movement of the work in combination with a feeding mechanism, substantially as described.

8th, The opener, G or G', substantially as and for the purposes described.

9th, The presser, D, in combination with the adjustable foot pieces, C or C', or both, substantially as described.

10th, The curved bearing plate, B, and lip or standard, C, in combination with the presser bar, substantially as and for the purposes set forth.

11th, The projecting curved horizontal table plate, A, constructed and arranged substantially as and for the purposes described.

12th, The open throat between B and E, when arranged substantially as described and for the purposes set forth.

13th, The projecting curved perpendicular plate, B, with standard, c, substantially as and for the purposes described.

30,184.—LAMP.—William N. Ely, Stratford, Conn., assignee by mesne assignments of L. B. Ely, Stratford, Conn., and B. Thayer, Boston, Mass. Dated May 4th, 1858. Application for reissue received and filed Dec. 6, 1867.

1st, I claim suspending the body of the lamp within an outer case so arranged that the air shall pass within the case and around the lamp body to the flame, substantially as described.

2d, A hollow lamp case, pedestal and base, constructed and arranged in relation to the lamp body, substantially as described.

3d, An annular lamp body in combination with an outer case, substantially as described.

4th, Constructing and arranging the parts so as to deflect the air coming up from outside the lamp body toward the flame, substantially as described.

5th, Supplying air to the flame by means of the channel formed between the body of the lamp and the outside shell or case, substantially as described.

6th, Arranging and using the rod or wire, k, in relation to the flame and hollow pedestal and case, substantially as and for the purposes described.

7th, The concave convex button constructed and arranged substantially as and for the purposes described.

28,568.—MACHINE FOR WEIGHING AND BAGGING GRAIN.—Harriet M. Fish, New York city, assignee of L. K. Elington and Wm. F. Fish, New York city, executors of James M. Fish, deceased. Dated June 5, 1860. Application for reissue received and filed Nov. 7, 1867.

What is claimed as the invention of said James Fish is, 1st, in combination with a weighing scale a grain bin fitted with a sloping bottom or sides, a bagging spout and gate to regulate the flow of grain, substantially as described.

2d, The use of a grain bin fitted with a sloping bottom or sides a bagging spout and gate to regulate the flow of grain substantially as described for the purpose of facilitating the bagging and weighing thereof, substantially as described.

3d, The arrangement of the bin, A, doubly-inclined floor, O, vertical gates, D, spouts, L, frame, B, and scale, M, the whole being constructed and combined substantially in the manner and for the purposes explained.

59,466.—SCHOOL DESK AND SEAT.—Calvin W. Sherwood, Chicago, Ill. Dated Nov. 6, 1866. Application for reissue received and filed Dec. 9, 1867. Div. A.

1st, I claim the joint composed of the nave, O, and axle, B', constructed and operating substantially as set forth.

2d, The arrangement and combination of the arms, C, nave, O, and axle, B', with the seat, D, and standard, A, substantially as specified.

3d, The double-acting stop, K, constructed and operating substantially as specified.

4th, So locating and arranging the stop, k, and axle, B', on the head, B, that with the nave, O, a covered and compact joint is provided, substantially as and for the purposes specified.

5th, The double-acting stop, k, in combination with the shoulder, l, operating in the slot or space, substantially as specified.

59,466.—SCHOOL DESK AND SEAT.—Calvin W. Sherwood, Chicago, Ill. Dated Nov. 6, 1866. Application for reissue received and filed Dec. 9, 1867. Div. B.

1st, I claim the joint composed of the nave, O, and axle, B', constructed and operating substantially as set forth.

2d, The combination and arrangement of the ledges, b, lips, a, and pins, d, with the braces, F, and hinged shelf, K, substantially as specified.

3d, The arrangement and combination of the hinges, arms, H, jointed braces, F, and hinged shelf, K, with the standards, A, and desk top, I, substantially as and for the purposes specified.

54,135.—WATCH.—S. D. Engle, Hazleton, Pa. Dated April 24, 1866. Application for reissue received and filed Dec. 7, 1867.

1st, I claim the employment of a box or supplemental case, B, to receive the movement of a watch secured in the external or principal case of the watch by means of studs or pins and a groove or by other suitable means for the purpose herein set forth.

2d, I claim the cap, h, with its flange, h', and washer, i, arranged with the key hole, g, in the manner and for the purposes herein described.

53,105.—LUBRICATOR FOR STEAM ENGINES.—John Storer, New York city. Dated March 13, 1866. Application for reissue received and filed Dec. 19, 1867.

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1/2, 123 1/2, 124 1/2, 125 1/2, 126 1/2, 127 1/2, 128 1/2, 129 1/2, 130 1/2, 131 1/2, 132 1/2, 133 1/2, 134 1/2, 135 1/2, 136 1/2, 137 1/2, 138 1/2, 139 1/2, 140 1/2, 141 1/2, 142 1/2, 143 1/2, 144 1/2, 145 1/2, 146 1/2, 147 1/2, 148 1/2, 149 1/2, 150 1/2, 151 1/2, 152 1/2, 153 1/2, 154 1/2, 155 1/2, 156 1/2, 157 1/2, 158 1/2, 159 1/2, 160 1/2, 161 1/2, 162 1/2, 163 1/2, 164 1/2, 165 1/2, 166 1/2, 167 1/2, 168 1/2, 169 1/2, 170 1/2, 171 1/2, 172 1/2, 173 1/2, 174 1/2, 175 1/2, 176 1/2, 177 1/2, 178 1/2, 179 1/2, 180 1/2, 181 1/2, 182 1/2, 183 1/2, 184 1/2, 185 1/2, 186 1/2, 187 1/2, 188 1/2, 189 1/2, 190 1/2, 191 1/2, 192 1/2, 193 1/2, 194 1/2, 195 1/2, 196 1/2, 197 1/2, 198 1/2, 199 1/2, 200 1/2, 201 1/2, 202 1/2, 203 1/2, 204 1/2, 205 1/2, 206 1/2, 207 1/2, 208 1/2, 209 1/2, 210 1/2, 211 1/2, 212 1/2, 213 1/2, 214 1/2, 215 1/2, 216 1/2, 217 1/2, 218 1/2, 219 1/2, 220 1/2, 221 1/2, 222 1/2, 223 1/2, 224 1/2, 225 1/2, 226 1/2, 227 1/2, 228 1/2, 229 1/2, 230 1/2, 231 1/2, 232 1/2, 233 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1/2, 789 1/2, 790 1/2, 791 1/2, 792 1/2, 793 1/2, 794 1/2, 795 1/2, 796 1/2, 797 1/2, 798 1/2, 799 1/2, 800 1/2, 801 1/2, 802 1/2, 803 1/2, 804 1/2, 805 1/2, 806 1/2, 807 1/2, 808 1/2, 809 1/2, 810 1/2, 811 1/2, 812 1/2, 813 1/2, 814 1/2, 815 1/2, 816 1/2, 817 1/2, 818 1/2, 819 1/2, 820 1/2, 821 1/2, 822 1/2, 823 1/2, 824 1/2, 825 1/2, 826 1/2, 827 1/2, 828 1/2, 829 1/2, 830 1/2, 831 1/2, 832 1/2, 833 1/2, 834 1/2, 835 1/2, 836 1/2, 837 1/2, 838 1/2, 839 1/2, 840 1/2, 841 1/2, 842 1/2, 843 1/2, 844 1/2, 845 1/2, 846 1/2, 847 1/2, 848 1/2, 849 1/2, 850 1/2, 851 1/2, 852 1/2, 853 1/2, 854 1/2, 855 1/2, 856 1/2, 857 1/2, 858 1/2, 859 1/2, 860 1/2, 861 1/2, 862 1/2, 863 1/2, 864 1/2, 865 1/2, 866 1/2, 867 1/2, 868 1/2, 869 1/2, 870 1/2, 871 1/2, 872 1/2, 873 1/2, 874 1/2, 875 1/2, 876 1/2, 877 1/2, 878 1/2, 879 1/2, 880 1/2, 881 1/2, 882 1/2, 883 1/2, 884 1/2, 885 1/2, 886 1/2, 887 1/2, 888 1/2, 889 1/2, 890 1/2, 891 1/2, 892 1/2, 893 1/2, 894 1/2, 895 1/2, 896 1/2, 897 1/2, 898 1/2, 899 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1/2, 1010 1/2, 1011 1/2, 1012 1/2, 1013 1/2, 1014 1/2, 1015 1/2, 1016 1/2, 1017 1/2, 1018 1/2, 1019 1/2, 1020 1/2, 1021 1/2, 1022 1/2, 1023 1/2, 1024 1/2, 1025 1/2, 1026 1/2, 1027 1/2, 1028 1/2, 1029 1/2, 1030 1/2, 1031 1/2, 1032 1/2, 1033 1/2, 1034 1/2, 1035 1/2, 1036 1/2, 1037 1/2, 1038 1/2, 1039 1/2, 1040 1/2, 1041 1/2, 1042 1/2, 1043 1/2, 1044 1/2, 1045 1/2, 1046 1/2, 1047 1/2, 1048 1/2, 1049 1/2, 1050 1/2, 1051 1/2, 1052 1/2, 1053 1/2, 1054 1/2, 1055 1/2, 1056 1/2, 1057 1/2, 1058 1/2, 1059 1/2, 1060 1/2, 1061 1/2, 1062 1/2, 1063 1/2, 1064 1/2, 1065 1/2, 1066 1/2, 1067 1/2, 1068 1/2, 1069 1/2, 1070 1/2, 1071 1/2, 1072 1/2, 1073 1/2, 1074 1/2, 1075 1/2, 1076 1/2, 1077 1/2, 1078 1/2, 1079 1/2, 1080 1/2, 1081 1/2, 1082 1/2, 1083 1/2, 1084 1/2, 1085 1/2, 1086 1/2, 1087 1/2, 1088 1/2, 1089 1/2, 1090 1/2, 1091 1/2, 1092 1/2, 1093 1/2, 1094 1/2, 1095 1/2, 1096 1/2, 1097 1/2, 1098 1/2, 1099 1/2, 1100 1/2, 1101 1/2, 1102 1/2, 1103 1/2, 1104 1/2, 1105 1/2, 1106 1/2, 1107 1/2, 1108 1/2, 1109 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